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## Contents

### Editorial :

*The CISM Technical Brochures* 2  
R. Mollet (CISM)

### International Structure of Physical Education and Sports 4

Professor J. Falize (Belgium)

### The Physical Training of Conscripts and Ordinary Military Personnel 7

Colonel Nils Sköld (Sweden)

### Boxing 1967 11

Bill Mc Namara (USA)

### Something new about Team Sports 14

### Problems in intensive athletics at medium altitude 15

Professor Doctor G. Schönholzer (Switzerland)

### Altitude training 19

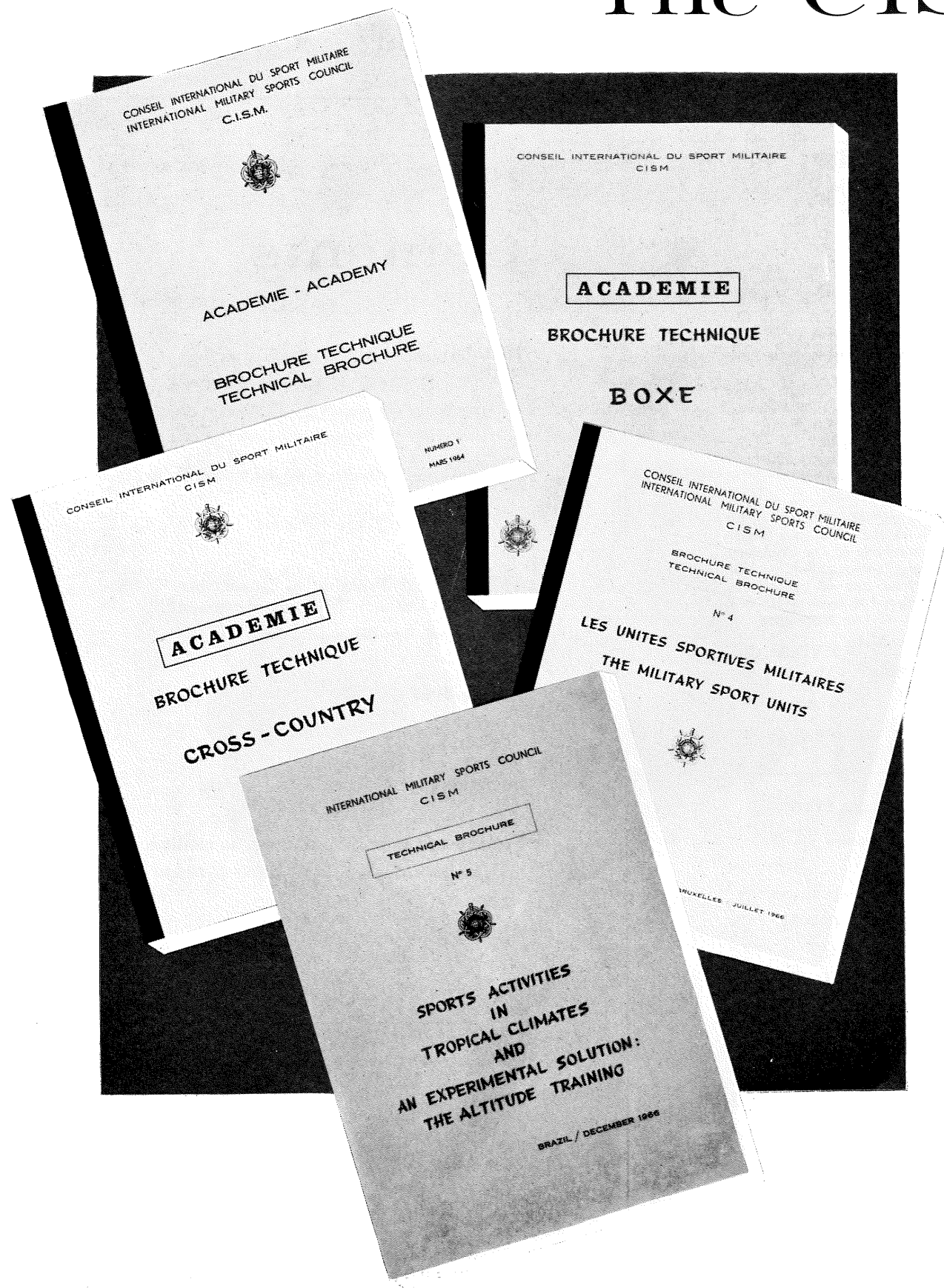
Cap. Lamartine Pereira da Costa (Brazil)

### The XIXth Military Pentathlon (Sweden) 24

### Life at CISM 30

Cover picture : This participant to the XIXth Military Pentathlon in Uppsala, Sweden, is warming-up for the grenade-throwing event. We selected this picture as it symbolizes the Energy, the Fitness and Courage of the Pentathlon Champions.

# The CISM Technical Brochures



## Editorial

*In the course of the last years, the « Study Days » of CISM have multiplied.*

*Held usually during the championships, they group the « men of the field » and the « men of the laboratory ». Those clinics encounter a growing success.*

*In order to diffuse the conclusions, we put together in the « Technical Brochures » the results of the studies and their conclusions.*

*I should like to point out to our readers the two last issues. The Brazilian Delegation has published the booklet n° 5 under the title « Sporting activities in tropical climate — An experimental solution, training in altitude ».*

*This most original and thoroughly documented work written by Captain Lamartine P. da Costa, takes as thesis the utilisation of altitude as « training load ».*

*We give, in extenso in this number, the interesting conclusions of that work.*

*In the booklet n° 6 altitude is still in question, but in a very different way.*

*Mexico is nearing very quickly. Many experiences have been conducted in several countries. Our Study Days of Tunis have tried to make the point. Thanks to Colonel Doctor Tatarelli and to Medical Doctor Commandant Vrillac we are able to present an interesting synthesis.*

*CISM continues its expansion in three directions :*

- planning of a wide annual calendar which groups each year more than 20 events;*
- conducting scientific and practical work thanks to its Academy and the publication « The Technical Brochures »;*
- making an enthusiastic campaign for the benefit of international friendship and understanding.*

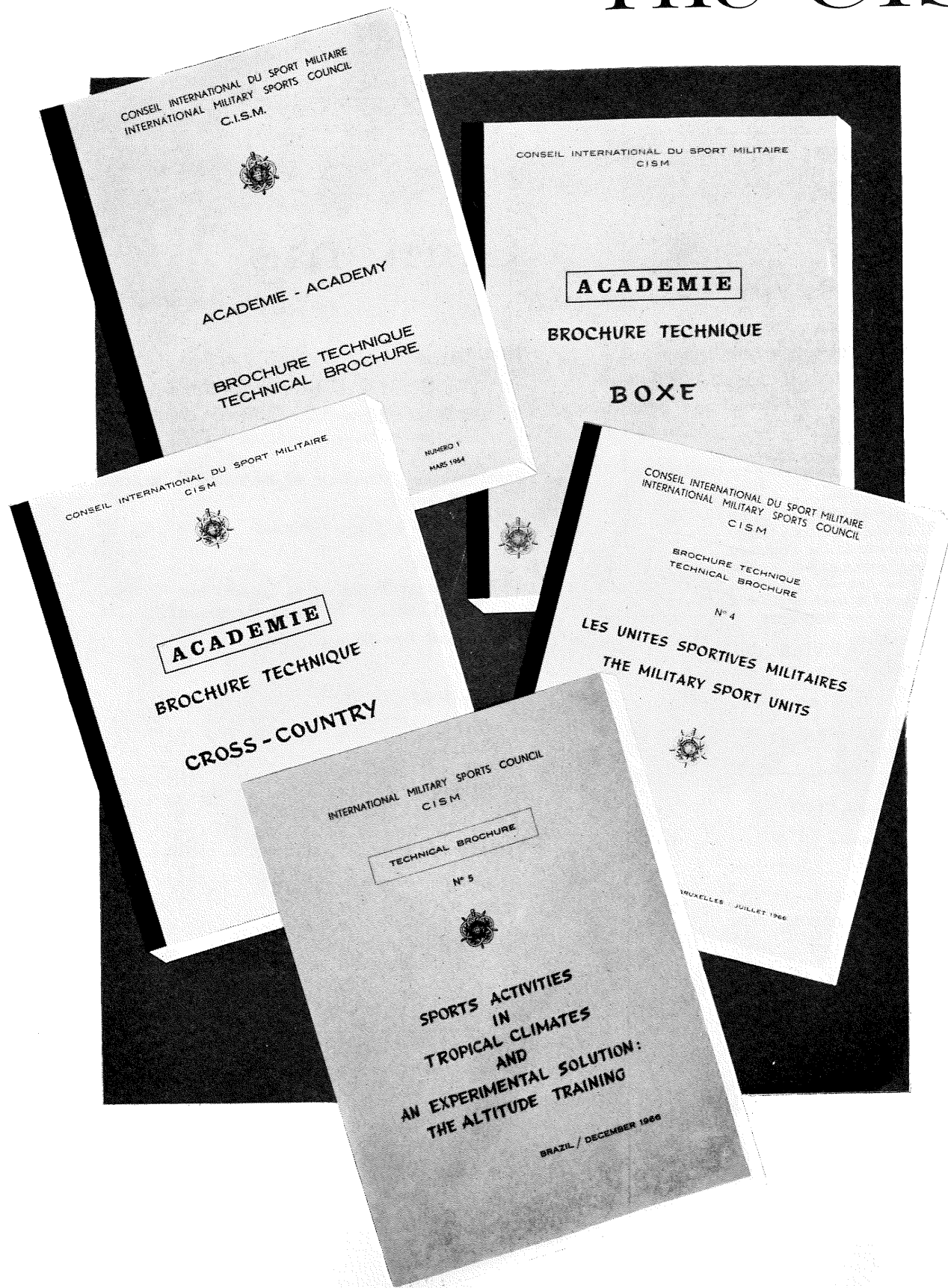
*Sport — Research — Friendship, the three key-words of CISM.*



Raoul MOLLET  
Permanent Secretary General.



# The CISM Technical Brochures



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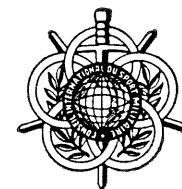
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# International Structure of Physical Education and Sports

CIO CIEPS  
CNO FIMS ICHPER AAU  
FSI CISM AGFSI

Prof. J. FALIZE, President ICHPER  
Belgium

The world has become smaller, and connexions are better, faster and easier. Correspondingly, changes have taken place in sports and physical education.

A large number of organizations have come into existence in the sector of sports and physical education, partly on a national level and partly on an international level, the latter ones frequently as a consequence of chance meetings. It is tried at present to improve and to simplify the relations needed among these organisations.

Out of the Paris World Congress for Physical Education in 1892 there resulted the modern Olympic Games. At the same time, physical education at school became organised. At the beginning of this century, the contrast between sports and physical education let mutual relations not become easy. There are still remnants of this contrast which must now be taken down.

Very schematically it can be said that the Olympic Games are organised by the International Olympic Committee (IOC-CIO), with the expert advice and assistance of the international sports federations (FSI).

Each country takes independently charge of its championships and contests. In each country a National Olympic Committee and the national-level sports organisations handle their own affairs and ensure the contact with the international sports federations and the International Olympic Committee. The International Federation for Sports at Universities (FISU) organises the inter-university contests. In a similar way the International Workers' Sports Committee (CSIT) looks after the organization of contests in the sector of workers' sports activities.

The International Military Sports Council (CISM) does the same for the military athletes.

There is also the International Olympic Academy engaged in the philosophy of sport, and especially the International Federation for Sport Medicine (FIMS). The physicians were the first ones to do scientific research work for the sake of a theory of physical education. FIMS is the sole non-sportive organization recognized by IOC. It is consulted also by the World Health Organization (WHO-OMS).

Contests and games are pastime activities. Most of the listed responsible organizations are, therefore, based on the principle of voluntariness. More recently the governments are also dealing with the extraordinary development of sports and their associations.

In the sector of teaching the situation is different. Physical education at school is a matter handled by the state, its normal objective being the education of citizens. In Europe systems of physical education have been drawn up in several countries. It is understandable that each nation decides on its own form of education and trains its teachers in line with its own concept. In each country associations of teachers have been set up and partly became united with similar organizations in neighbouring countries. Out of this, for instance the following international federations were created :

- the International Federation of Ling Gymnastics (FIEP) comprising the teachers of gymnastics in the Nordic and Latin countries;
- the International League of Modern Gymnastics which tries to assemble the teachers in private schools of gymnastics in Europe.

These federations receive only little assistance from the governments.

Between 1957 and 1959 the World Confederation of Organisations of Teaching Profession (WCOTP-CMOPE) set up an International Council for Health, Physical Education, and Recreation (ICHPER) because these problems were a matter of constant interest for its members.

Corresponding to the scheme of WCOTP the organization of ICHPER takes charge of the following groups :

- the national organisations of sports teachers;
- the universities and teachers' training colleges;
- individual teachers;
- international confederations working towards the same objectives.

The annual congress of ICHPER has legislative authority; an executive committee, its members being appointed for a three-years term, handles the executive sector. Its President, Vice President and Secretary General are elected by direct vote by the annual congress. Other members may be co-opted into the executive committee.

The tasks of ICHPER are reflected in its publications :

- reports on the congress (to date nine international and two regional reports);
- investigations on physical education and games as included in curricula, training of teachers for physical education, statutes of sports teachers, experience by games and dances;
- the « Bulletin » published four to five times a year;
- the « GYMNASION » review published every three months.

The financing is ensured by annual grants from WCOTP which is under Statute A with UNESCO, and from the national US-American Association for Health, Physical Education, and Recreation (AAHPER).

Among the international organisations of sports teachers ICHPER is the only one which is wide enough spread to become active on all continents. It is neutral under aspects of ideology, politics and race and it relies on better cooperation among all experts of physical education which shall be promoted by ICHPER in all ways and through collaboration.

When UNESCO announced its special interest in sports and physical education in 1959 the hopeful expectation came up that in the near future an urgently needed concentration of the individual activities practiced till then would happen. The international conference of Helsinki in 1959 on « Sports, Labour, and Culture » decided on the holding of a constituent meeting of the World Council for Sports and Physical Education (ICSPE-CIEPS) on the occasion of the Olympic Games of Rome in 1960. What are the tasks of this world council and how does it work ?

The world Council for Sports and Physical Education has advisory relations with UNESCO and it belongs in it to Statute B. It is attached to the « Adult Education » section. Till now it has not yet decided in favour of competitive sports or of educational questions.

ICSPE-CIEPS embraces the following groupings :

- international organisations such as FIEP, CISM, YMCA, Catholic World Federation of Sports, International Confederation of the Sport Press and a few international sport associations (basketball, volleyball, amateur soccer);
- national state-operated organisations;
- national independent organisations;
- schools and institutions;
- individual members.

Every two years the General Assembly elects the members of the Executive Committee. This Committee is the executive organ and handles all issues of the organizations.

The general tasks are handled, on the one hand, by the Office for Documentation and Information and, on the other hand, by the Research Committee to which working groups are attached. The Executive Committee meets twice a year and studies the suggestions coming from the working groups.

The very different tasks and circles of persons make it impossible for the time being to pass final judgment on the role of this young organization which, above all, is hampered in its activities by a narrow financial basis.

In 1963, I was entrusted by the Executive Committee of ICSPE-CIEPS with the task to start another attempt to coordinate the various organizations, especially to establish contacts between ICSPE and ICHPER regarding the matter of a joint office for documentation.

Three years later, both organisations participated in a world congress at Madrid which was arranged by the national institute for physical education in Spain together with FIEP. Already at the opening session I had the good luck to obtain the approval for cooperation from all organizations represented.

During the Madrid congress our agreement was also joined by delegates of the world federation of sport physicians (FIMS) so that the following communiqué was adopted and released :

« In the course of the World Congress for Physical Education and Sports held at Madrid from September 13 to 18, 1966, the impression that closer cooperation and an increasing coming-together of the international organizations of CIEPS, ICHPER and FIMS is urgently needed was developed.

« These three organizations have resolved on starting joint actions as soon as possible in the following fields :

- documentation and information;
- scientific research;

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- documentation and information;
- scientific research;



— preparations for a joint congress of the three organisations to be held in Mexico 1968 at the time of the Olympic Games.

For this purpose in the near future meetings of representatives of the three organizations will be called which shall at the same time deliberate over a structural reform to make possible still closer cooperation. To this meeting other international organizations, if a wish to this effect is expressed, will also be invited.

Although we can indeed not yet attain a plain union, we consider it a hopeful fact that joint actions have become possible.

(sgd) CHAILLEY-BERT,                   NOEL-BAKER,  
          President of FIMS                   President of ICSPE  
  FALIZE,  
  President of ICHPER »

From what sides and quarters did resistance come against an union of the organizations? From the international organizations and societies. Those holding responsible functions are afraid that in case of joint actions they might lose their autonomy and their individual existence. And this despite the fact that out of common efforts they would emerge only as partners and not as opponents.

The establishment of closer relations began through personal direct contacts. Which led the French delegation to submit a proposal to the last general conference of UNESCO. There was no resistance against the petition which was backed by the USA and Belgium. The Director General of UNESCO will now present his certainly very valuable suggestions to the next general conference.

Meanwhile, two meetings have been held, one at Spa, Belgium, in November, 1966 which created the new platform for the Office for Documentation and Information as shown before. A three-members committee maintains the connexions between the Office and the organisations and at the same time with the offices of United Nations.

The second meeting was held at Paris from May 8 to 11, 1967 and ended with the formulation of a big action programme to be followed up to the end of 1967. It comprises the following points :

- 1) *Sports and Education*  
This study is in the hands of ICHPER.  
The term « sports » has different meanings in the various languages. In this context it means physical education, sports and games, outdoor activities, and recreation.
- 2) *Sports and Democratization*  
Professor J. Kral (OSSR) and D. Vinge (Canada) will draft a memorandum regarding this matter.
- 3) *Sports and Health*  
All three organizations will make contributions out of their specific fields.
- 4) *Protection and Development of Sportive Ethics*  
The International Fair-Play-Trophy Committee P. de Coubertin shall draft a programme for it.
- 5) *Sport and the Development of the Individual and of the Nation*  
This study has been entrusted to ICSPE.
- 6) *Sports and International Understanding*  
Dr. Jones has been requested to submit a study on it.
- 7) *Sports and Sciences*  
The three organisations will coordinate their individual programmes.
- 8) *Sports and Information*  
This point has been left to the Office for Documentation which has rendered outstanding work in this field for six years already.

More recently, the specialized international sports associations agreed in Geneva to set a general assembly. This shows the will to closer cooperation throughout the world of sport and physical education. We dare express the hope that the next Olympic Games to be held in Mexico in 1968 will offer the chance to attain a total change by which the effectiveness of our organizations and their actions will be increased.

# The Physical Training of Conscripts and Ordinary Military Personnel

Colonel Nils SKÖLD

Sweden

## Acknowledgement

*I wish to express my deep gratitude to Army captain Rolj Larson from the Swedish Armed Forces Physical Training and Sports School for his valuable help in preparing this paper.*

The purpose of this talk is to provide guidance on the subject of fundamental military views regarding physical training, the experience we have gained so far and the requirements that must be stipulated now and in the future. Because of the short time available, the account given has been limited to the state of affairs in the army.

The object of training in peacetime is to create military units which will have to be capable in time of war of solving the problems the civil authorities will have imposed upon the defence forces in accordance with the objectives of military power. The aim therefore is to bring the training of the individual and the collective training of units to such a pitch of efficiency that it can be maintained even in a situation of mortal peril and throughout periods of hard and persistent physical strain.

The points of departure for military training are the physical and mental states of the conscripts and their general education and technical knowledge before the beginning of their first term of service. The methods of training used must take account of this initial situation. They should then, with this as a foundation, lead in the simplest and most effective way to the objective — units which are fighting-fit.

The course of development in military service means that operations in the future may take a speedier and more violent course than formerly. In its turn, this means that more will be demanded from soldiers and units. But we must also realize that the elements which go to make up the point of departure are continually changing.

A result of the progress of social welfare in the modern community is that conscripts are taller and healthier than they used to be, while at the same time most of them are unaccustomed to physical effort and the other ordeals that accompany life on active service. It is debatable whether this, seen as a whole, is a disadvantage or an advantage, but it is in any case a fact that must be faced. Furthermore, conscripts are technically more competent, and on an average they have a considerably higher level of general education than was

formerly the case. This facilitates training. However, the fact must also be taken into account that the complicated and arduous conditions of life in our society increase stress and the number of individuals who in one way or another are illadjusted. Our methods of training must be constantly adapted to the ways in which the initial situation changes. The military environment must take effective training possible and help to create unity and a good spirit. This requirement must be fulfilled. However, the military environment must not differ from the civilian environment more than necessary. Divergences from the normal civilian standard are only justifiable if sound service reasons can be appealed to, for example the need for fitness in the field.

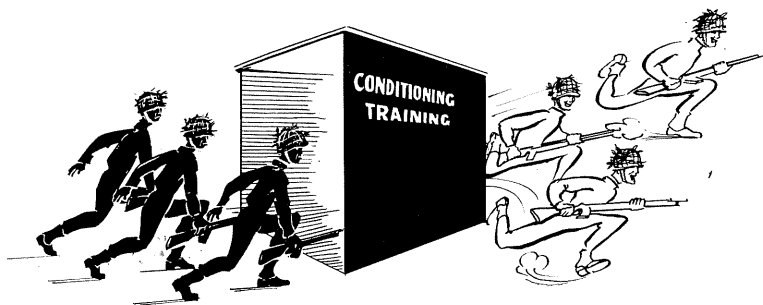
## The Fundamental Military View

Good condition — keeping in form — in good physical and mental form, is absolutely essential for all military personnel if activities in peace and in wartime are to be able to function satisfactorily. To achieve this, training is necessary. This physical training should make it possible for military personnel to face up the rest of their training and the exertions of life in the field. I believe therefore that a short description of the way this training is carried out is called for.

In themselves, military exercises of different kinds have a certain power to improve condition. However, it is important that special exercises in physical training shall be carried out, regularly and at a higher rate of performance than that which is applied for other training. Otherwise the troop will be exerting itself to the maximum of its resources every day, so that working efficiency and contentment will suffer in consequence.

Our aim is that physical training of conscripts shall be directed and carried out in such a fashion that the men are subjected to a positive influence. If possible, they should continue with regular training in some form or another even after their discharge. We have a conscript army — or you may say a citizen militia — and it is in the interests of national defence that the conscripts stay in good shape during the whole of the period in which they are liable to be called up for military service, namely until they are 47 years old. For most of them, conscription for military service means changing to a way of living that is considerably more mobile than civilian life. Adaptation or training to the new level of activity may take several weeks in the case of an untrained man. The consequences of their being in poor condition when they are called up will always be that training is comparatively ineffective in the early stages. If war breaks out, and that is a possibility which nowadays may involve fast-moving operations and that the enemy may try to take us by surprise, the situation may become serious — the enemy will probably hardly be inclined to give our troops a few week's extension of time for training.

In view of these facts we are naturally interested in what the community is doing as far as the physical standards of the Swedish



people are concerned — within the scope of the schools and in other ways. Everything that is done to improve this standard favours our work.

The military forces are the final authority that can directly influence the individual. But in military activity — as in other fields — we find that we have to learn more and more in a shorter and shorter time. However, without healthy soldiers there will be no effective military units. There must therefore be accommodation for physical training on the programme. But we are compelled because of the time factor to concentrate training carried on during the period of service on what is most essential.

This concentration is on *condition training* or form-building exercise, which is of fundamental importance for raising the physical capacity for work and for keeping it at a high level. Primarily, condition training aims at building up capacity for carrying out hard work over a long time. The type of activity chosen involves movement, which gives large groups of muscles work to do — for example, running and skiing. Condition training ought to consist of the following three stages: *rush training* — mainly to develop muscular strength and speed; *interval training* — mainly for developing the organs that convey oxygen (training the capacity of the heart, the blood circulation and the lungs) and *distance training* — mainly for developing the bone structure, joints, ligaments and skin, and for physically and mentally accustoming the individual to hard work over a lengthy period of time.

In addition to condition training — and supplementing it — further training is carried out to develop general muscular strength, often in the form of «circuit training». Moreover, a soldier is expected to undergo some special training, for example to develop his aptitude in overcoming obstacles (hurdling) which as well as providing exercise in mobility, flexibility and strength also promotes courage and resourcefulness. A similar example is training in orienteering. At the same time as this develops a man's capacity for finding his way with the help of a map and a compass, it also includes the distance-training stages of condition training.

In military training, the serviceman's innate urge to hold his own and to assert himself on behalf of the unit should be developed in a sound way by means of competitive elements. Physical training makes wide use of these. The element of competition passes over in the course of training more and more into the fostering of team spirit by means of contests in groups and platoons, for example in various kinds of field contests (combined field tests).

Otherwise *competitive military activities* mainly comprise sectors which have a direct influence in increasing preparedness in the field, for instance shooting, field contests (shooting and orienteering), and combined athletic events including shooting, such as the military pentathlon.

This competitive activity is to a large extent arranged for officers and NCOs. The decisive importance of the leader in different military operations need not be specially emphasized. It is sufficient to mention that a leader's brain must function normally even under the greatest physical trials. That is why officers and NCOs must be brought to endure hard contests and continually keep their physical capacity at a high level.

After this account of the military view I shall pass on to deal with the experience we have gained so far.

## Experience

The experience of which I shall give an account has in part been published previously, and some of it is certainly familiar to many of my readers. But I believe that it would be valuable on this occasion to give a brief summary of the results.

As a basis for determining the extent of military physical training and the principles on which it was to be founded, one of the factors utilized was the experience gained on the condition of military personnel at different stages of training and the reports on such experience provided by those in charge of training. This experience has often been based on a general, *subjective* observation of the capacity of personnel in coping with different situations. Various experiments have been made over the years, however, with the aim of supplementing the subjective impression with an *objective* determination of physical capacity in the form of measurable tests. In this connection, the research of industrial physiology has been able to supply increasingly important contributions to the methods of determination used. There has thus been intimate collaboration between the military training side and the *Royal Central Gymnastics Institute (GCI)* with its physiological department, and — naturally — the *Military Medical Examination Centre (MMUC)* since it was founded.

In the selection of suitable methods training, the principles developed by the physiologists, for instance in the study of star athletes, have been used. During recent years, for instance, the GCI has with the assistance of *Doctor P O Astrand* helped to work out the army's training instructions, primarily as regards condition training.

I shall now report some investigations which have been made with personnel in the army and from which it has been possible to obtain the results of certain experience.

1. At the beginning of 1950 a modified form of the Harvard step-up test, the so-called *Bergman Test*, was carried out with

conscripts during their first period of service. This test consisted of five minutes climbing up and down a forty-centimetre high bank at the rate of thirty ascents per minute, after which pulse restoration was ascertained manually after one minute's rest. The conscripts were tested when they were called up, and again three times during the first six weeks, and after that every other month for the last time when they were about to be discharged.

In the training-year 1964-1965, the same step test was carried out with conscripts during their first period of service in the army. The men were tested at the time of their call-up and after about 6 weeks, after 18 to 20 weeks, after 28 to 30 weeks and when they were discharged.

These results are of especial interest on account of the great number tested.  $\pm 40\ 000$  conscripts.

A study of the development of the men's condition indicates that the main improvement in working capacity took place during the first few months. This particularly marked among artillerymen in 1952-1953. Physical training is conducted regularly during the first few months of military service. Other inquiries also confirm that the pulse rate when a standard task is being performed falls rapidly during the first weeks of training. When unit training begins, on the other hand, it is more difficult to conduct rational training and at the same time to maintain or preferably to improve physical condition. This fact has been born in mind and we are investigating the possibilities of achieving a more regular course of training throughout the entire training period.

If a comparison is made between the results in 1952-1953 and 1964-1965, a significant deterioration in the physical working capacity of the infantrymen becomes apparent, both at the time of calling-up and throughout the whole period of training. The reason for this has not been explained. But the selection made may have been different, and less satisfactory from the point of view of industrial physiology in 1964. Again, the requirements for military service may have been lowered in consequence of increased motorization. In general, no conclusions can be drawn from this comparison.

2. *MMUC investigations 1958-1959* shows generally a similar picture of the development of condition as in the previously reported step-test investigations. The physical working capacity, rises steeply during the first few months, to remain at the same level thereafter.

3. *MMUC examination (1958-1960) of 48 pupils at the Swedish Armed Forces Physical Training and Sport School* (officers and NCOs on active service with an average age of 30 years, undergoing schooling to be leaders and instructors in physical training).

Although the Physical Working Capacity was comparatively high on call-up, it increased significantly after one month's and four months' training respectively. This seems to confirm that even a man in relatively well trained condition can improve if justification and other essentials exist.

4. *In the training year 1964-1965 the army, experimentally carried out compulsory physical tests for officers and NCOs on active service and conscripts during their first year of service.* At the same time, compulsory regular condition training was introduced for all officers and NCOs. The purpose of the experiments was to intensify condition training for army personnel and to obtain essential materials for working out standards to be used as an objective in physical training for various categories of personnel in the army. *For officers and NCOs* the tests comprised a physiological test supplemented by *two practical physical tests* (cross-country running 3 kilometres and orienteering). The tests were passed in both spring and autumn. The physiological test was carried out in the form of a bicycle ergometer test with sub-maximum work for 6 minutes and evaluation of the maximum oxygen capacity per kilogram of body weight from an «Astrand nomogram». Age factor was used.

The result of the tests on officers and NCOs undergoing the bicycle ergometer test and cross-country running is shown in table I.

The highest average, figure obtained from the bicycle ergometer test in the different age groups is in the vicinity of 50 (— 29 years), 45 (30 to 39 years), 40 (40 to 49 years) and 35 (50 to 55 years) respectively.

The tests on conscripts comprised a *physiological test* (step test) and *practical tests in speed* (running 100 metres), strength («push-ups» and «chin ups») and *endurance* (cross-country running for 3 and 5 kilometres and movement on foot for 20 kilometres with a certain amount of equipment).

The results of the tests on conscripts stated in the *average figure for a platoon* are shown in table II.

It is evident from the results of the other tests that the conscripts have increased their capacity in speed, strength and endurance.

5. Since 1961 *cadets* for every year's course at the *Royal Swedish Military Academy* have undergone function al tests on the bicycle-ergometer on the same lines as those used in the army in physical tests for officers since 1964. The cadets have been tested at four different dates as shown in table III.

The result of the average figure for all cadets during five year's courses is shown in the table. In comparing the average figure for officers on active service in the same age group (younger than 29 years) it appears that when a cadet is called up for the officer's course he is somewhat above this figure (49.4 as compared with 47.7). The cadet is then affected by a relatively regular condition

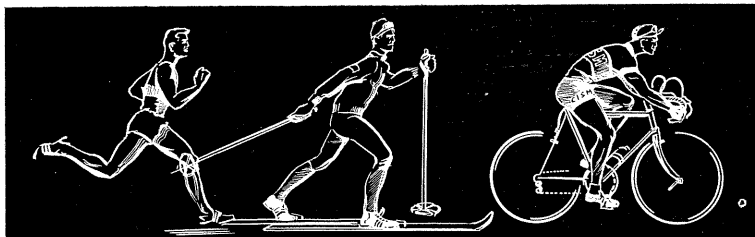


Table I. Results of physical tests of officers and NCO's on active duty in the army 1964

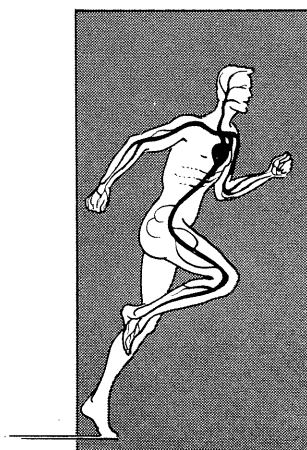
Test	Average of agegroups							
	—29 years		30—39 years		40—49 years		50—55 years	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Bicycle-ergometer test (ml/kg × min)	46.9	47.7	43.4	44.8	36.7	38.6	33.4	33.8
(About 5 900 officers and NCO's on active duty)	(About 2 000 on active duty)		(About 1 600 on active duty)		(About 2 000 on active duty)		(About 300 on active duty)	
Cross-Country running 3 km (Easy running) (Min, sec)	13.25	13.37	14.50	14.52	16.25	16.25	—	—
(About 4 800 officers and NCO's on active duty)	(About 1 800 on active duty)		(About 1 300 on active duty)		(About 1 700 on active duty)		—	

Table II. Result of physical tests of conscripts during 1st period of service 1964 about 20 000 conscripts

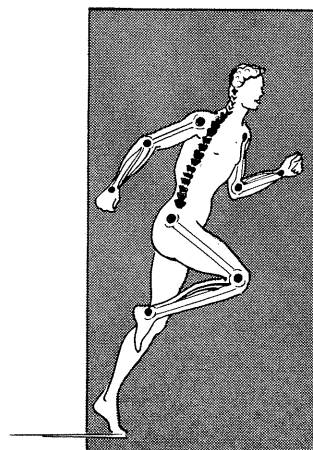
Test	Induction	Average of platoon at period			
		2 (beginning) After 6—7 weeks (about 1/7)	2 (end) After 18—20 weeks (About 1/10)	3 (end) After 28—30 weeks (About 15/12)	4 (end) After 40—42 weeks (About 15/3)
Steptest (pulse)	114	105	99	97	96
Running 100 m (sec, 1/10)	—	14.2	13.9	—	—
« Push-Ups » (times)	—	18	20	22	—
« Chin-ups » (times)	—	6	7	8	—
Cross-Country running 3 km (easy running), (min, sec)	—	14.17	13.52	—	—
Cross-Country running 5 km (min, sec)	—	—	—	25.02	—
Traveling on foot 20 km with some equipment (hours, min)	—	—	2.30	—	—



RUSH TRAINING



INTERVAL TRAINING



DISTANCE TRAINING

training and reaches his highest figure (56) in March, immediately after the winter exercises in Norrland in the north of Sweden, where condition training in the form of skiing has favoured condition development.

6. In summarizing the physiological tests on army personnel reported here, perhaps the following final conclusion can be drawn. Present military service in the army seems to demand a physical working capacity for officers and NCO's expressed in ml O<sub>2</sub>/×min, of 50 (—29 years), 45 (30—39 years), 40 (40—49 years) and 35 (50—55 years) respectively, and for conscripts during their first period of service, expressed in kilopond metres/min (PWC<sub>170</sub>), of about 1175, and expressed in the test pulse (step test) of about 95.

## Conclusions

I emphasized in the introduction that military activity in peacetime aims at the creation of units which can effectively carry out their tasks under very severe conditions. To reach this objective, two essential requirements are that the condition of personnel is improved during the first service period and that this condition is maintained if possible at an acceptable level throughout the whole period of liability to military service.

What we must strive for, therefore, is allround training — in speed, strength and endurance — with emphasis on the essentials. The conscript should also be encouraged to carry on with training on his own initiative.

The results I have described here today show that goods results can be achieved by means of rational training. The results are of course utilized also to bring about successive improvements in the methods used. The instructions for training-activities are worked out for this purpose in close collaboration with the physiological experts we have in Sweden.

As an example of the demands which have to be fulfilled today I would like to refer to a few points in the instructions of the Commander in Chief of the Swedish Army for the training of officers and NCOs.

Table III.

Result of test of cadets at the Royal Military Academy  
Year's courses and number of cadets

1961-1962	1962-1963	1963-1964	1964-1965	1965-1966
112	131	137	148	176
Total : 704 cadets			Average age : 23 years	
Average of all cadets 1961-1965 of bicycle-ergometer test (ml/kg × min)				
October	December	March	August	
49.4	51.5	56.0	54.2	

It is said there that all actively engaged military and civilian military personnel shall carry on regular condition training during duty hours. At least one period of hard training — 30 to 45 minutes of effective exercise per week in the form of cross-country running, skiing, strenuous gymnastics etc. as well as applied distance training once a month, for example in the form of orienteering, are required to maintain good condition. The need for adaptation of the intensity control of training with due regard to age, state of health and state of training must be borne in mind.

Officers and NCOs on active service must pass tests every year for control, as shown in table IV.

In the same way, there are detailed regulations for training and tests with conscript personnel.

Finally, I merely wish to emphasize that a continued adaptation of our methods to the requirements of progress are of course necessary, and that we should also aim at improvements. In this respect, a good and confident collaboration between physiologists and the military can give good results for the benefit of our important military efforts in contributing to security in our part of the world.

Table IV. Officers and NCOs on active duty carry out yearly tests as below

Test	Number of times	Date	Aim of age group					Standard of age group	
			—29 years	30—34 years	35—39 years	40—44 years	45—49 years	50—54 years	55—59 years
1. Bicycle ergometer test (According to directions in « Physical training », section I, edition of 1964)	2	1 time Jan.—June 1 time Aug.—Dec.	About 40 ml	About 47 ml	About 44 ml	About 41 ml	About 38 ml	About 35 ml	About 32 ml
2. Crosscountry running 3 km (Easy running) alternatively « Ski-Running » 15 km	2 (At least 1 time cross-country running)	— » —	Maximum 14 min	Maximum 15 min	Maximum 16 min	Maximum 17 min	Maximum 18 min	(No time limit)	
3. Mapreading crosscountry running	2 (Of which 1 time during the night for officers not yet 45 years)	— » —	Least 8 km	Least 8 km	Least 8 km	Least 6 km	Least 6 km	Least 6 km	Least 6 km

## References

- » ALLMÄN TRÄNINGSLÄRA » (truppföredrag i fysisk träning, fastställt genom avd Utb 4/5 1957 nr 33 : 2).
- » FYSISK TRÄNING » HÄFTE 1, KONDITIONSTRÄNING OCH KONDITIONSTESTNING (1953 och 1964 års upplaga, fastställda genom oa 305/1953 resp oa nr 80, 4/ 1964).
- HELLSTRÖM, R. : Body build, muscular strength, and certain circulatory factors in military personnel. Acta Med. Scand. 1961. Suppl. 371.
- » PROV M M i FYSISK TRÄNING » (ao Ast/Utb 27/2 och 15/12 1964 samt ao nr 258/1965). « ÅSTRAND NOMOGRAM ». Acta Physiol. Scand. 49 (suppl. 169), 1960, pp. 45-60.
- ÅSTRAND, P.-O. : Hur snabbt går det utför med svenska folkets kondition ? Särtryck ur Svenska Läkartidn. 1960 : 57 : 406 (nr 6).
- ÅSTRAND, P.-O. : Fysiologisk värdering av fysisk arbetsförmåga och kondition. Särtryck ur Idrottsmed. vademecum, CIBA 1960, sid 12—34.

# BOXING 1967 - BOXING 1967 - BOXING 1967 -

## Bill McNAMARA, USA

More than simply a contest of nations, the XXth CISM Boxing Championships turned out to be something of a clash of styles : a confrontation between technique boxing and old-fashioned power punching. Neither theory emerged unscathed.

It would be foolish to seek a rigid equation of one nation with one boxing theory — describing all the Americans at the tourney, for example, as punchers and all the Germans as canny, fleet-footed dancers devoted to the techniques of defensive boxing. It is not that simple.

But as fight after fight went into CISM record books at the crowded Field House at Fort George G. Meade, Maryland, the audience had identified three kinds of boxers : the dancers, the punchers, and the dancers who were forced to become punchers as the rounds wore on. And you could see the personalities and methods of the individual boxers melding subtly into national characteristics readily identifiable with the three kinds of boxers.

In the end, it was the emergence of these national personalities that made the tournament four nights of boxing as its exciting best — despite early fears for its success caused by last-minute cancellations that narrowed the field to seven nations. This was just one more than the six-nation CISM minimum, but it turned out to be more than enough.

Firmly entrenched in the middle of the theoretical road was the game four-man South Korean squad that captivated the crowds from the first night on.

Setting a pattern that the Koreans seemed to follow throughout the tourney, bantamweight Cho Song Young danced defensively for the first two rounds of his opening night bout against Thailand's Kongoon Songkram. Then in the third round, bleeding heavily from a cut over his eye, Young erupted suddenly with a flurry of combinations, slamming Kongoon across the ring with a solid right to the jaw, and finishing him off with another right at 1:58 of the third round.

In the third night's competition, Young staged a repeat performance against the USA's Al Robinson. Stalked by Robinson in rounds one and two and hurt in the last round by combinations to the head, Young came back to pin Robinson in the corner. Beating a relentless tattoo on Robin's head, Young scored his second TKO of the week at 2:08 of round three.

To the crowd's screams of « Ambush him » the four Koreans did just that all week. Dancing blithely away from their bewildered opponents and sustaining nasty cuts in the opening rounds, the Koreans continually erupted almost on cue in the third round. By this time, their opponents were invariably tired from the chase. The strategy worked well.

The Koreans ended up with three of their four starters in the finals : Young, featherweight Sung Eun Kim and lightweight Lee Chang Kil. Kim bested America's Cornelius Benson, the only American finalist to lose, and Kil squeaked by Werner Ruzicka of Germany in a bloody fight that had the crowd on its feet from the first round on. Young, clearly the crowd's favorite, lost to France's Aldo Cosentino in a decision heartily booed by the audience.

The French, too, had three of their four contestants in the finals, but only Cosentino came up with a CISM gold medal. Perhaps the cockiest and most aggressive of the seven teams, the French brought the crowd to their feet all week by carrying the fight to their opponents from the opening bell.

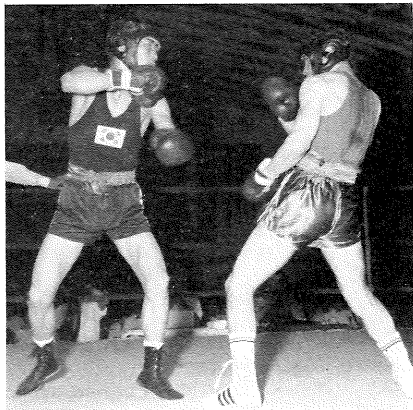
In the finals, forced to defend against the overpowering punching of the Americans, the French resorted to technique defense, but to no avail.

Light middleweight Karl Jaschke, who completely outclassed Germany's Horst Heindl in a semi-final bout, was felled by a right to his mid-section at 1:24 of round two in the finals by America's Ray Owens.

Receiving line at the opening reception, left to right : Brig. General William W. Berg, USAF, Deputy Assistant Secretary of Defense for Military Personnel Policy; Lt. Colonel Willi Rieke, Germany; Lt. Assaga, Cameroon; Lt. Martin, Ivory Coast; Colonel Lee, Korea; Colonel Maucourt, France; Colonel Anu, Thailand; Colonel Don Miller, USA, Chief of U. S. Delegation to CISM.







Light heavyweight Bernard Malherbe scored a technical knockout at 2:38 of the third round in a semi-final bout with Germany's Helmut Ladwig. But he was decisioned in a bruising fight in the finals by Art Redden of the United States.

The most aggressive and most popular of the Frenchmen, lightweight Dominique Azzaro, was the only one not to make the finals. His opening night bout with Cameroon's Etienne Bediouhoune, who had almost a foot advantage in height and reach, had the crowd yelling «Dominique!» and «Vive la France!» before it was over. Carrying the fight all the way, he battered Bediouhoune until the referee had to stop it at 1:35 of the third round.

Azzaro was outpointed by Werner Ruzicka in a closely contested semi-final bout that saw Azzaro aggressively pursuing the lanky German. But Ruzicka used his superior reach to good advantage, countering Azzaro's strong inside punching with long left jabs to Azzaro's nose.

The German team, expected from the outset to be in close contention for all but one of the 11 weight divisions (they entered no light flyweight), placed six fighters in the finals. But the only member of the squad to garner a gold medal when the last bell had rung was welterweight Gunther Meier, a skilled technique tactician. The others, with the exception of Ruzicka, fell victim of the American punchers.

Meier's quarter-final encounter with America's Bobby Reid was startlingly similar to Cho Song Young's battle with Robinson. Backed into the corner in the first round by a hard right cross from Reid, Meier covered his head with both hands and let Reid's storm of punches rain harmlessly down on him. Obviously outpowered, he danced away from Reid, finally summoning up a last-round reserve of energy to stun Reid with a combination to the head. His comeback and consistent defensive skills earned him a close split decision over Reid.

In the finals, Meier was matched against powerful Joseph Bessala of Cameroon, who had scored the quickest knockout of the tourney in 1:39 of the first round against the Ivory Coast's François Doh. A powerful, never-defeated all-Africa champion, Bessala looked like a strong bet to outslug the wily Meier.

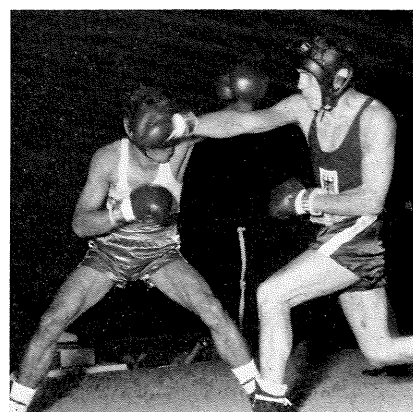
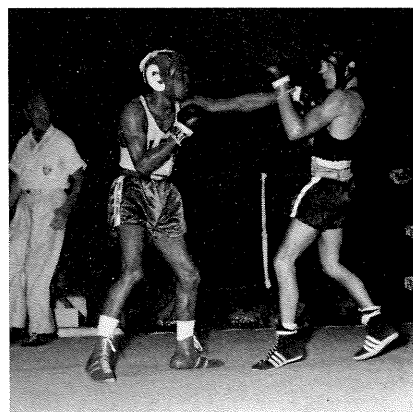
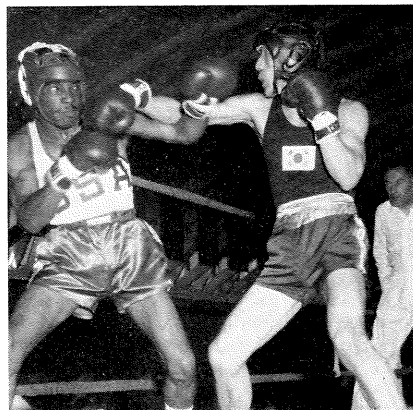
Though it was more of a close-in fight than Meier's defensive ability might have indicated, his elusiveness did manage to tire Bessala visibly by the third round, earning him another close decision and the CISM welterweight championship, his fourth CISM gold medal.

But the big story of the XXth CISM Boxing Championships was the American team's overpowering final round showing. Bringing eight men to the finals, the Americans ended up capturing 7 of the 11 weight division titles — all but one of them on the strength of plain power punching.

The lone exception was light featherweight Harlan Marbley. As agile as the best of the European and African technique proponents, Marbley danced circles around Boti Goue of the Ivory Coast, flicking dazzlingly fast left jabs in Goue's face, followed by powerful right hooks. Marbley, who stopped dancing after the fight only long enough to listen to the first of the seven times the American National Anthem was played for United States victories, also displayed amazing defensive ability, dodging and leaping away from Goue's hardest punches with apparent ease.

The other six American gold medalists were punchers, pure and simple. They displayed amazingly similar styles, calmly, almost dispassionately pivoting in the middle of the ring while their opponents circled and jockeyed for position. Then, with quick, powerful punches, the Americans moved in to hem them into the ropes.

James Wallington, a Viet Nam veteran with the poise of a professional, stalked Germany's Manfred Gierth, punishing him whenever Gierth slowed down, to win an easy decision and the CISM light welterweight title. In the flyweight division, an aggressive last round proved the decisive margin as John Sheppard out-pointed Luther Kannewurf. Four of the American victories came in the final five bouts of the tournament. Two were by knockouts and one by a technical knockout. The first was the victory, mentioned earlier, of Ray Owens over Karl Jaschke of France. Former German citizen Martin Berzewski scored a technical knockout over a bloodied Ewald Wichert of Germany, and Art Redden decisioned Bernard Malherbe.



Cho, Korea, vs Consentino, France, in Bantamweight Final. Referee — Mueller, Germany.

Flyweight — Preliminary Bout : Chang, Korea, lands a right on Sheppard, USA. Referee — B. Mascot, Germany.

Flyweight — Sheppard, USA, lands a left on the jaw of Kannewurf, Germany, in the final bout. Referee — Surkien, USA.

Flyweight : Kannewurf, Germany, lands a right to the head of Prapan, Thailand, in a semi-final bout won by Kannewurf.

The final bout of the tournament was a heavyweight match between Tyrone « Brute » Hollins and Germany's Werner Larmann, who had the advantage over Hollins in height, weight and reach. But Larmann didn't make it through the first round, as a series of combinations by Hollins left him staggering against the ropes. Hollins's jabs rocked his head back and set him up for the clincher : a long right that knocked Larmann to the canvas and dazed him so badly that the referee stopped at 2 : 59 the first round.

The conclusions are obvious. The emphasis in CISM boxing is heavily on technique : the boxer's ability to land punches and skillfully avoid his opponents attack. But of the 11 CISM gold medalists, only two or three at most could be considered classic technique boxers. The rest, in one degree or another, were punchers, and punching seems to have worked out nicely.

The toe-to-toe school has won this round. But nobody is resting on his laurels. Technique is far from dead. And next year's XXIst CISM Boxing Championships will be the stage for the next round in the clash of the theories. Boxing enthusiasts can hardly wait.

Welterweight : Meier, Germany, wins decision over Bessala, Cameroon, in finals. Referee — Mascot, France.

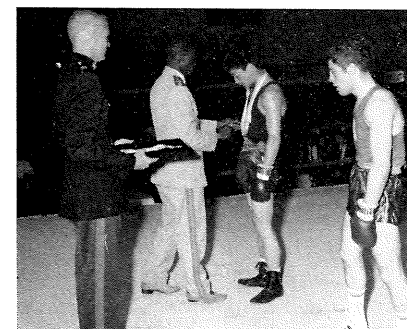
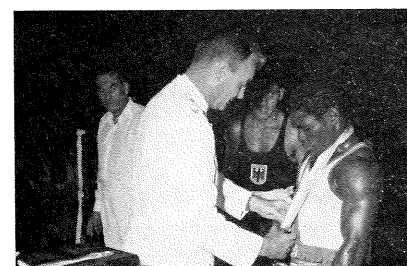
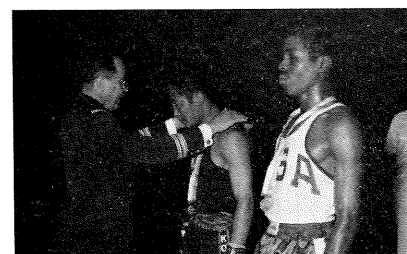
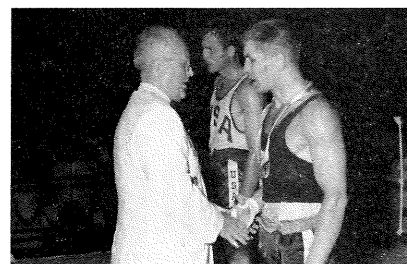
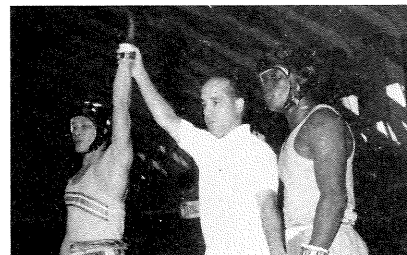
Welterweight : Thongchai, Thailand, wins over Bazie, Ivory Coast, in a preliminary bout. Referee — Iacobelli, USA.

Middleweight : Major General C. E. Johnson, Chief of Staff, First U. S. Army, congratulates Wichert, Germany, on winning Silver Medal. Berzewski, USA, was the Gold Medalist.

Featherweight : Col. Macourt, France, presents Gold medal to Kim, Korea, after Benson, USA, received Silver Medal.

Welterweight : Colonel Don Miller, USA, Chief of the U. S. Delegation to CISM, presents the Silver Medal to Joseph Bessala, Cameroon. Gunther Meier, Germany, awaits his Gold Medal. Referee — B. Macot, France

Bantamweight : Lt. Martin, Ivory Coast, presents Silver Medal to Cho, Korea. Consentino, France, awaits presentation of the Gold Medal.



## CISM FINAL

### SUMMARIES

Light-Flyweight : Harlan Marbley, USA (24th Div.) decisioned, Boti Goue, Ivory Coast.

Flyweight : John Sheppard, USA (9th Div.) decisioned Luther Kannewurf, Germany.

Bantamweight : Aldo Consentino, France, decisioned Cho Song Young, Korea.

Featherweight : Sun Eun Kim, Korea, decisioned Cornelius Benson, USA (Ft. Hood).

Lightweight : Lee Chang Kil, Korea, decisioned Werner Ruzicka, Germany.

Light-Welterweight : James Wallington, USA (Ft. Bragg) decisioned Manfred Gierth, Germany.

Welterweight : Gunther Meier, Germany, decisioned Joseph Bessala, Cameroon.

Light-Middleweight : Ray Owens, USA (Ft. Campbell) KOd Karl Jaschke, France, 1 : 24 of 2d.

Middleweight : Martin Berszewski, USAF, TKOd Ewald Wichert, Germany, 1 : 07 of 3d.

Light-Heavyweight : Art Redden, USMC, decisioned Bernard Malherbe, France.

Heavyweight : Tyrone Hollins, USA (Ft. Campbell) TKOd Werner Larmann, Germany, in 1st round.



# Something new about Team Sports

Last May, at the Faculté des Lettres et Sciences Humaines of Tours-Orléans, Mr. Raymond Chappuis, Director of Studies at the National Institute of Sports of France has defended a thesis whose title is the following :

« Contribution to the study of the dynamical structures of the team ».

Professor of physical education, Raymond Chappuis has endeavoured to use the basis of modern psychology to solve the problems he has met as a soccer trainer. He has undertaken studies at the Faculty, which have led him from a psychological licence to a diploma of superior studies, and at last to a doctor thesis, which he has brilliantly defended.

For the first time in France, a sportsman is to be seen joining the knowledges of a Universityman and of a fieldman. This is why we have welcomed his thesis' analysis sent to us by our friend Jean Paulhac, Professor of Physical Education and writer.

\* \* \*

The trainers of collective sport are often wondering to see a player skilful on the ball and not egoistic — sporting slang would say « personal »-lacking of efficacy in the midst of collective action. This player, who sometimes benefits of an excellent vision, does not however « perceive » the situation, as the trainer, who cares about efficacy, would wish it.

The reports of Raymond Chappuis have thus met three sectors :

— The first one concerns the affective and technical structures of the team. Players like each other, sympathize, do not care about the others or dislike them at all degrees.

Small exclusive groups or attached to the other groups by mediator players, rise in the team. Streams are sometimes at dubble flow between the players, sometimes one way (one likes without being liked). The team itself is influenced by the surroundings : managers parents, supporters, press, radio etc... All these affective pressures, internal or external, beneficial or detrimental, influence the quality of the game.

Their study, established through codified questionnaires, allow to reorganize the team following not only the technical capacities but also the affective connexions between the players.

— The second study sector of Raymond Chappuis concerns the visual perception, psychological operation in which the eye is only an instrument.

Every player has a visual field, which is seldom homogeneous and presents preferential sectors but also gaps, « holes », blind sectors.

An originally machinery, — sixty-five lamps placed on a half circumference in front of the tested player who pedals on an ergometric bicycle, — allows to determine those sectors of vision. The lamps are lighted following a determined plan and the player has to answer by pressing a grip on the handle-bar. Signal and answer are registered, which allows to measure the gaps of reaction and to determine the structure of the field of vision.

The first utility of those tests : the trainer can dispose his players following their complementary visual capacities. Soccer teams have so been modified in their composition, as well as volleyball and basketball teams.

— the third study sector concerns the collective tactical intention.

Raymond Chappuis has projected to the players of a team the snapshot taken at the 56th minute of the last soccer match opposing France to Italy. The results scientifically obtained reveal that among one same team the tactical intentions are different.

The registered documents allow to understand the individual intentions and the speed of their formulation.

A collective education of the tactical conception may be undertaken, following the process being studied at present time.

Thus, one perceives how much the studies of Raymond Chappuis surpasses the frame of individual and collective technic in which collective sports have often been locked up.

Technique is not in the least negligible, but it is narrowly tied to the player, to his perceiving capacities, his affectivity, his intellectual capacities, in a word to his whole personality.



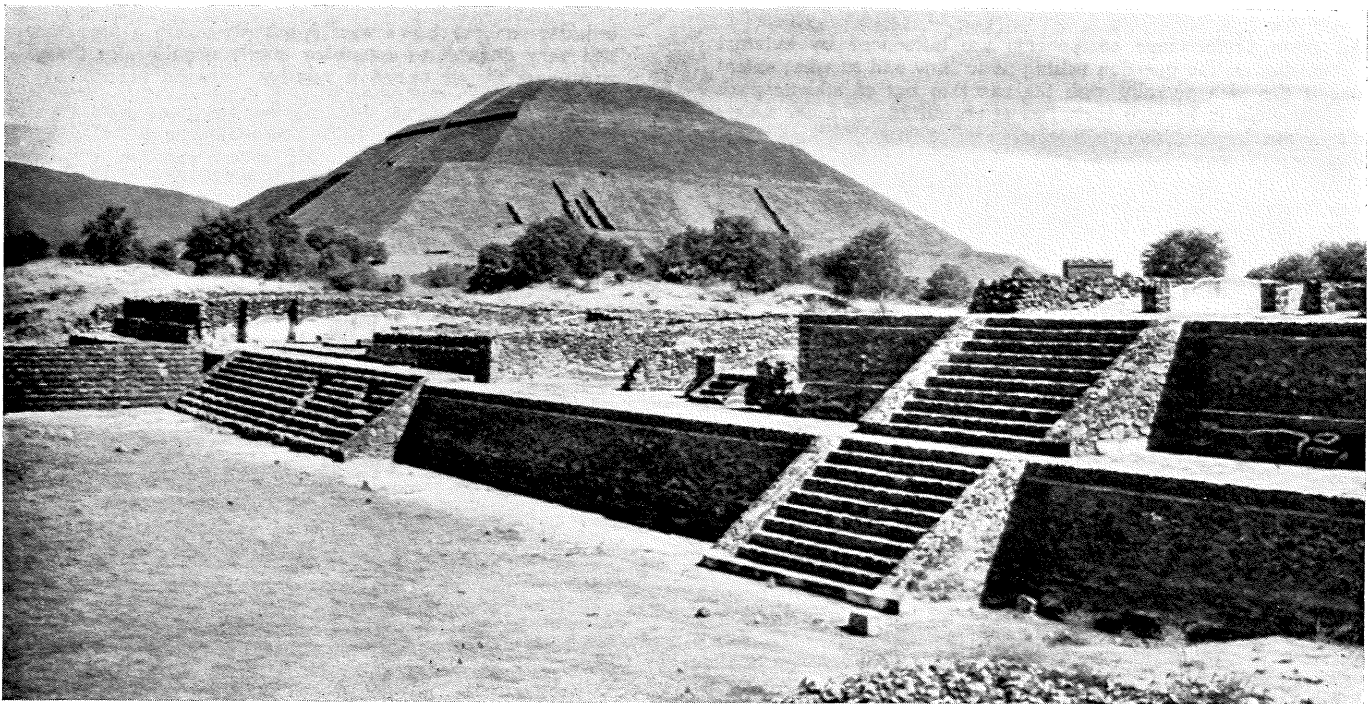
# PROBLEMS IN INTENSIVE ATHLETICS AT MEDIUM ALTITUDES

Prof. Dr. G. SCHÖNHOLZER  
Switzerland

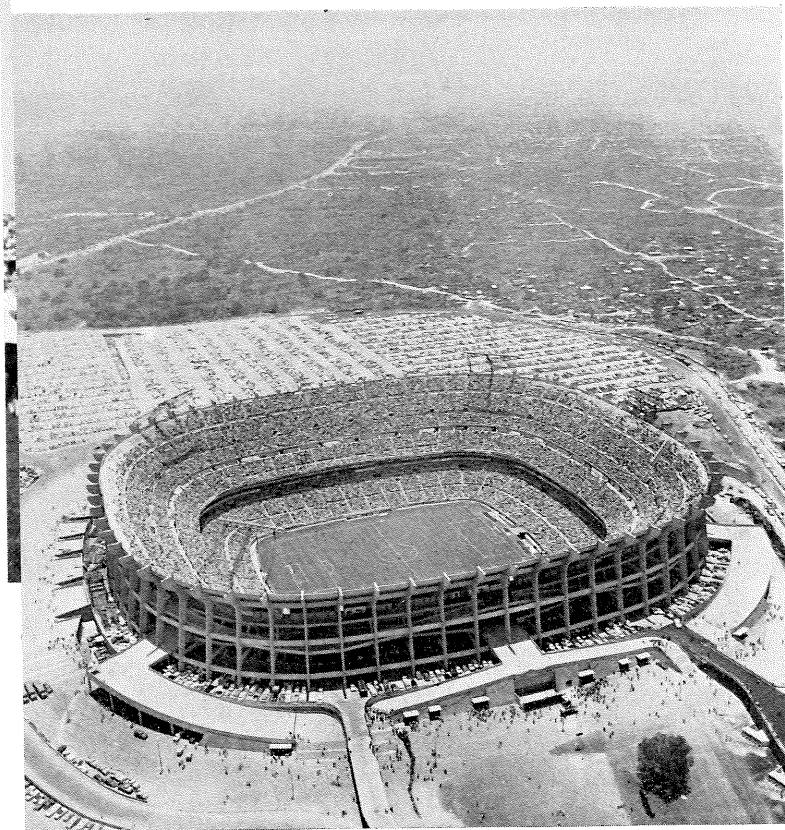


Aztec calendar

Football is a team sport, and it does not have to be especially emphasized that the result of a game depends to a very great extent on whether the 11 players really constitute a team. On the other hand, the performance of a football team is also based on the physical and mental quality of the individual players. This, again, is made up, as in all other types of athletics, of different components, muscular strength, continuous endurance (aerobic capacity), resistance (anaerobic capacity) and the central-nervous and nervous capacities (adroitness, coordination, reaction). Strength, on which speed is also dependent to a great extent, is an effect of muscular action. The extent of continuous endurance, i.e., the capacity to keep up a high-level



San Juan Teotihuacan Pyramids one of the center of attractions. A majestic structure of the ancient TOLTECAS civilization.



Aztec Stadium

performance over a long period of time of the heart-circulatory-respiratory system. Resistance, i.e., the capacity to maintain a maximum performance in the state of maximal oxygen debt for as long as possible, is dependent on biochemical circumstances in the body and in the blood. The central nervous system is responsible for movements, coordination and reaction.

All these performance components are influenced by external circumstances, the question arising as to how and to what extent this is the case actually with the carrying out of athletic peak performances in Mexico City, i.e., at an altitude of 2 300 meters above sea level. Although a number of special questions arise, it seems to me essential for the football specialist that he be familiar, in a general way, with the principles obtaining at the present time. For this reason, it may be of interest to give a brief summary of the findings established during the last two years in various symposia, conferences and expeditions. It has to do with the 6th Symposium « Sport at medium high altitudes » Magglingen, December 1965, the Symposium « Exercise and altitude », Albuquerque, New Mexico, USA, March 1966, the Symposium « Exercise at altitude » in Milan and St-Vincent, October 1966, the scientific meeting of the Société médicale française d'Education physique et de sport, Paris, December 1966 and several expeditions to Mexico City by the British, the French, the Italians and the Swiss.

From the results available there can be derived a fairly large number of principles, although it has to be stressed that the interpretation of the findings for the different kinds of sports must be made on the basis of knowledge and experience and also in part on the basis of common sense. The reading of a summary report, moreover, by no means relieves the responsible person involved of the duty of familiarizing himself with original findings and specialist literature. Otherwise he runs the risk of making mistakes owing to inadmissible simplifications and schematic formulas. Popular notions and press reports no longer suffice as a working basis for trainers, coaches and other responsible persons.

Let the reader also consider that at the present time many things — positive and negative ones — are scientifically verified but that other questions are still undecided and that in 1968 — the year of the great Olympic experiment — there will still be gaps in our knowledge.

## THE BASIC PROBLEMS

In Mexico City, at an altitude of 2 300 meters above sea level, the following factors have an effect on the organism :

- the altitude, and connected with it, the reduced atmospheric pressure (by around 25 %) and the lowering of the oxygen pressure and the air density by the same amounts;
- climatic factors, in the first instance, reduced humidity;
- time displacement, depending on the ordinary place of residence of the competing athlete;
- altered living conditions of different kinds.

The question arises as to how far and to what extent athletic efficiency in Mexico City is affected in the various types of sport and how far and to what extent suitable measures (preparation, training, preventive measures) are likely to maintain or even to step up performance capacity.

## SUMMARY FINDINGS

### a) Physiological effects

- limitation of aerobic capacity (continuous endurance), at first ranging between 10 and 15 %, after acclimatization, less depending on the individual;
- influence on anaerobic capacity not yet precisely determined, obviously in the sense of a partial compensation of the limitation of the aerobic capacities;
- interference with process of recovery;
- no influence on muscular strength;
- influence on psycho-nervous functions, taking a form that is still very difficult to determine, surely negative for the most part, possibly on occasion positive (« alarm reaction »);
- shifting of performance limit to other functions in comparison with low altitude regions (limited maximum pulse rate, diffusion capacity of lungs during severe exertion, hyperventilation, hormonal processes);
- release of numerous functional alterations and adaptation processes.

### b) Physical effects

- diminution of air resistance for the athlete and the different parts of his body, especially during rapid movement and in the case of large surfaces;
- diminution of air resistance for athletic equipment (projectile, wheel, boat, ball, etc.);
- modification of aerodynamic conditions.

### c) Effects on athletic performances

- impairment of all continuous endurance (aerobic capacity), of more than 60 sec. duration, rising in proportion to same; latter apparently as consequence of decreasing potentiality of compensation by anaerobic capacities;
- no impairment of short-term endurance (anaerobic capacity), (explosive performance);

- no impairment of full expenditure of strength. Occasional intensification not excluded (psycho-nervous alarm reaction);
- the effective performance is a resultant of the physiological and physical factors (air resistance and aerodynamics, e.g., during short-distance running, cycling, certain kinds of throwing, etc.). Whether the result expected is better or impaired as compared with performances at low altitudes is something that has to be studied precisely in each individual case, and, even more, has to be experimentally tested;
- in the case of intermittent endurance, account has to be taken of the limitation of recovery.

#### d) Functional alterations and adaptation processes

- acute, short-duration effects (time, altitude, temperature, travel, etc.): functional alterations which can be deduced from the behaviour of the circulation, the metabolism, the blood, etc. For the most part, negative effect on performance capacity in general;
- more gradual long-term effects (oxygen deficiency, dry climate): acclimatization (adaptation) concerns in particular the oxygen - receptive, - transporting and - transmitter system (respiration-blood-heart-circulation-tissues) and thus the continuous endurance capacity;
- the alteration difficulties have to be overcome for all athletes before good performances can be expected;
- the athlete performing in short bursts must have overcome at least the conversion difficulties before good performances can be expected. Better yet is complete acclimatization. He can surpass his own peak performance at low altitudes;
- the athlete performing over longer stretches has to be completely acclimatized. He can approach his low-altitude peak performance, but not attain it or surpass it (provided he was previously given optimum training);
- athletes who adapt poorly to the altitude ought to be eliminated;
- pyknic-athletic constitutional types apparently adapt worse than leptosome-athletic types.

#### e) The time factor

- the alteration process occupies hours or even periods up to several days. It is apparently facilitated by previous sojourn at high altitudes;
- acclimatization occurs in 2 to 4 weeks, depending on organic constitutional system: certain functions require considerably longer periods (acide-base metabolism, blood, body water);
- acclimatization occurs in phases. There is no uniform opinion regarding « crises » and their times of occurrence (8th day, 17th day). Rather there is probably involved individually different « negative phases », the emergence of which depends, among other things, on the preparation beforehand and on the average altitude of the athlete's home country;
- there is a prevailing view that a stay in Mexico City of 2 ½ to 3 or even up to 4 weeks before the meets is indicated;
- it is also believed that there should be a 2 to 3-week period of altitude adaptation prior to the trip;
- some favour an interim of a few days between prior training and arrival in Mexico (home leave and trip), others favour leaving out the visit home;
- there is no uniformly prevailing view on the question of an interim between arrival and start of training in Mexico City. Some favour full-scale activity as soon as possible (after 2 or 3 days), others favour a rest of several days.

#### f) Training and altitude training

- athletes who do not start with optimum training form are unsuitable for peak performance in meets in Mexico City;

- athletes who are not specially prepared (depending on the type of sport) for performance at high altitudes are unsuitable for peak performance meets in Mexico City;
- altitude training has two aims in view: acclimatization and training as such;
- good training form (endurance, capacity) facilitates and shortens the altitude adaptation. Highly trained athletes often react with severe complaints, but these are of shorter duration than is the case with others;
- good acclimatization facilitates altitude training;
- optimum altitude range for training sojourns: 1 800 to 2 300 meters above sea level;
- high altitude sojourns, especially those over 2 000 meters above sea level, entail the danger of low training intensity (especially muscular strength). Losses of strength to be avoided;
- conversion to living at high altitudes and acclimatization capacity can be trained. Several altitude training periods in the preparation time are useful.
- altitude training in the shape of short-term ascents and descents has a certain effect;
- altitude training (with careful consideration of the risk of loss of strength) improves personal peak performance 2 to 4 days after return to low altitudes. The duration of this after-effect is not yet exactly known, but it may likely be somewhat longer;
- the following are decisive for the effect of altitude training: the altitude, the training intensity, the duration of stay.

#### g) Medical point of view

- only healthy athletes — healthy in the strict sense of the word — are suitable for peak performances at high altitudes. Even the slightest disturbance diminishes altitude resistance;
- vaccinations are to be carried out in plenty of time;
- the danger of stomach and intestinal complaints can be eliminated by means of preventive treatment and team discipline;

University Stadium



- high altitude pulmonary oedema is hardly involved at the altitude in question. Nevertheless, there is a certain liability in the case of infections of the respiratory tract;
- no special risk need be assumed for peak performances at 2 300 meters above sea level. However, relatively severe states of exhaustion have to be reckoned with, in which cases administration of oxygen is useful and is permitted;
- medical attention must be appreciably intensified in comparison with former Olympic Games. This view likewise corresponds to that of the Fédération Internationale de Médecine Sportive;
- medicaments can act differently (possibly with more pronounced effect) at high altitudes. Doping can have especially dangerous effects at high altitudes. Artificially administered oxygen accelerates recovery (rest), improves performance, however, only if it is administered during same (practically impossible).

#### h) Hygienic points of view

- the dryness of the air has to be watched. Humidification is called for;
- a special attempt has to be made to combat mutual infection if illness occurs;
- food intake must be carefully supervised and planned. Carbohydrate requirements are greater at high altitudes protein requirements less, than at low altitudes;
- raw foods, especially raw health foods, salads, unpeeled fruit, are to be avoided. Danger of acute disturbances and of amoebic infections;
- vitamin and mineral requirements are to be covered in the shape of special preparations;
- alcohol is to be taken in great moderation, if at all;
- smoking is to be forbidden;
- expert massage is important. At such altitudes muscular aches are common after severe performances.

#### i) Psychological points of view

- the Mexico «adventure» must be systematically stripped of its «mystique» (not trivialized)». Objective orientation! Press campaign!
- the lengthy training period, some of it on the spot, emphasizes the problems of homesickness, lax discipline, «Olympic claustrophobia», mental break down, and makes the intervention of qualified escorts, who have known the competitors for a long time, rather more important than otherwise;
- leisure activity, reading matter from home, esprit de corps without mutual irritation are all of the utmost importance.

In conclusion, it may be pointed out that all physical and psychological processes, especially those involving conversion and adaptation, vary to a very great extent from one individual to another. A team will produce the best results if its training and leadership proceed on the basis of extensive knowledge and can be varied to fit the individual. The individually varied reactions are per se awkward for the managers and trainers, occurring as they do in exceptionally severe conditions, but they must not in any case lead to the trivialization or underestimation of the problems; what should prevail is the principle of very intensive technical, medical and administrative participation. The slogan «The athlete and his trainer», especially for a small nation, has a great significance, along with the very careful and severe process of selecting the athletes.

#### Bibliography

- a. 6th Magglingen Symposium «Sport at Medium Altitudes» Swiss Journal for Athletic Medicine 14, 1-329, 1966.
- b. Reports of the British, French, Italian and Swiss delegations to the pre-Olympic Competitions in Mexico City, 1965 and 1966.
- c. Report by B. Balke on the Symposium «Exercise and altitude», Albuquerque, 1966.
- d. Author's own information and experience.

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Rectory Tower.  
University City, Mexico.  
On the right, David Alfaro  
Siqueiro's mural in relief  
and mosaics.



# ALTITUDE TRAINING

Capt. LAMARTINE PEREIRA da COSTA  
Brazil



The feasibility of a method of physical training, which considers the altitude as a stressing factor for the development of resistance and endurance, is perfectly accepted in view of the data discussed. Therefore, we may formalize this process of work — **Altitude Training** — with a basis on the experiments accomplished and with the following functional organization :

(1) In principle, in this new method, the altitude will act as a « load » of any given exercise. As is known, the yield obtained by the application of different loads will reside in the direct reason of the dosage: if this is applied gradually, it will be assimilated, and if it is excessive, a condition of inhibition or of protection will be present. At the same time of this process, another task of counter-resistance will be carried out, in which the stressing agent will be the climbing effort. In this way, specific functional adaptations are to be expected in regard to the resistance offered by the altitude and by the difficulty of progress on unlevelled ground, and not modifications of a physiological nature, commonly observed in the phenomenon of acclimatization.

(2) Basically, the utilization of altitude for this type of physical preparation does not restrict itself to training in altitudes, but consists in the passage from one level to another, in a way as to attain a progressive decline in the partial oxygen pressure.

If an athlete makes an effort at a certain altitude, or in an amplitude of reduced variation, organism will have a tendency to acclimatization to that level and the stressing factor will disappear after some period of time. In addition, the transfer of the athlete alone to a high place (above 1 500 meters) will create an initial condition of protection, of variable duration and individual action, which will prevent for some time a maximum yield in so far as the « quantity of work » factor is concerned. Although the physiological adaptations resulting from acclimatization in this new place of training will originate an improved performance in lower levels, the advantage will be of transitory nature and will disappear after some days.

(3) The functional amplitude of differences of level for the obtention of a stressing factor decreases with the altitude, since the capacity of work is inversely proportional to height. According to observations discussed, and in consonance with the requirements in so far as quantity of work in training is concerned, the largest yield should be that which is produced by effort carried out between 500 and 1 500 meters above sea level, covering a distance of 20 to 40 kilometers between the two points, considering climbing and descending. To this aspect, one may add the detail of individual reactions of each person, both caused by the altitude effects, as well as by the distance covered. Another scheme of work for individuals resident in locales at high altitudes, would consist in climbing the programmed distance in a more reduced amplitude of variation of levels; thus, for example, an athlete who lives at 1 500 meters, would climb up to 2 000 meters through a less steep route. In any way, only a practical experience at the location chosen will determine this amplitude, especially above 2 000 meters, with consideration of a known and marked reaction of individuals to altitude.

(4) In view of its features, **Altitude Training** is a mixed method of work, since the use of altitude only develops **Resistance and Endurance. Speed, Strength, Coordination - Rhythm** for the specific case of the

long distance races and short distance races — and **Resistance** envisaged separately, should be developed through the usual procedures of work: repetitions of running at small distance and high speed, exercises with weights or isometrical contractions and time-controlled repetitions of sub-maximum intensity in medium distances.

(5) The loads of altitude should be individually applied, according to the athlete's capacity and of the level from which the climbing effort will be initiated. The number of loads in a program of work depends upon the degree of the development of **Resistance** and **Endurance** with relations to other qualities that are being envisaged with the training. This dosage will essentially depend upon the evaluation of the trainer to maintain the balance of the points envisaged. It was noticed in various occasions that the excessive number of loads produces a considerable reduction in **Speed**, although the employment of three times per week, in a group of athletes who accomplished a joint work, did not bring any remarkable consequence. The best system apparently consists in alternating the altitude loads with the intensity loads in the running, completing it with counter-resistance loads (weight). An example of a weekly basic program for a confirmed athlete who sustains a load of 1 500 meters altitude and a total distance of 160 kilometers per week, may be:

Monday: 20 km climb and 20 descent: departing from 500 m and arriving at 1 500 m altitude.

Tuesday: 30 to 40 × 200 meters, in athletic track, at 28 sec - 30 sec, with maximum active interval of 90 sec, covering 200 meters; or 15 to 20 × 400 m at 60 sec - 70 sec, with maximum active interval of 2 min, covering 200 m; exercises with weights.

Wednesday: 8 to 10 × 100 meters at 85 - 90 % of the best time in distance, with maximum interval of 3 min.

Thursday: same as Monday.

Friday: same as Tuesday.

Saturday: same as Monday.

Sunday: same as Wednesday.

To reach this stage, graduation also depends on the individual capability, and should be carried out by means of the increase of repetitions of short and average distances for the work on athletic tracks. For altitude, gradualism refers itself to the intensity of the effort of climbing: departing from the alternated march with small races and attempting always to improve the earlier performance (time) in the subsequent training. For the quantity of total work, the distance of 160 km was established as a guide, since empirical experience refers to it in considerable degree: the limit in the numbers of kilometers is of individual nature and may be situated above or below of this value. Only observation of the athlete during a long time will show its real capability.

Climb should be made by alternating the speed: larger in straight areas and more reduced in the

curve. For the descent, this directive becomes of special importance. The experiments made show that different athletes experienced, during various days, acute pain in the knees after the mountain training; the elimination of the descending route, or the control of the speed in the descent, ceases these effects.

(6) **Altitude training** is a method which develops itself in a high degree of capability of sufferance of the athlete, making him confident and capable for competition. One observes, however, that the trainer should not request the maximum effort from the athlete during the initial stages, considering the strength of the stimulants (altitude and the climbing effort), which may cause a condition of strain within a short period time. Joint training, on the other hand, is the best indicated: one registered a decline in the production of certain athletes who were working separately; on the other hand, work accomplished under the form of competition exhausts the athletes, reducing the production on the subsequent day. A process, which has shown its efficiency in collective work, consists in organizing an individual departure, with 30 sec to 60 sec of interval, and have each athlete control his own performance.

(7) **Altitude Training** may represent an efficient solution for tropical and sub-tropical areas, where there are mountains, and where one desires to raise the level of possibilities in relation to **Resistance** and to **Endurance**. In the specific case of Brazil, this feasibility is exceptional: the coastal area is marked by irregular terrain and penetrates into the interior in the area of largest development and concentration of population (Rio de Janeiro, Minas Gerais, Sao Paulo, Santa Catarina and Paraná). In addition to the permanent temperate microclimates encountered in this area, and which may serve as a basic level for the training of exceptional athletes, one encounters places adequate within or close to the large cities for the organization of training larger groups.

The selection of appropriate sites for the hot and humid areas in a general way, needs to be done by means of a geo-sportive survey, whose main points to be taken into consideration are as follows:

**Temperature:** in a general way, the decrease of temperature with altitude corresponds to 1° C per 150 to 200 meters of height. According to **Delgado**, in Brazil this gradient is situated between 0,53 and 0,58 centigrades per each 100 meters. These values are larger in the winter — contrary to temperate regions — which should thus be programmed as the basic period of time for the annual training calendar.

**Humidity:** the absolute value of humidity contained in the air also decreases with altitude, stressing the intrinsic features of certain sites. The proportionality of the decline may be evaluated by a certain area, according to **Piery**, in accordance with the following percentages:

0 m	=	100 %
1 000 m	=	70 %
2 000 m	=	49 %
3 000 m	=	35 %
4 000 m	=	24 %

This detail is highly important for the yield of the work, and it is known that the gradual reduction of the absolute humidity of the air will be linked to the equivalent behaviour of the temperature, adding the effects and creating more favorable conditions progressively when the altitude is overcome.

**Polution of the air:** the content of impurities in the air reduces with altitude and renders the environment more pleasant and refreshing (**Sargent**, 1964) for breathing, which is affected in efforts in climbing.

**Wind:** the speed of the wind increases with the altitude for an identical area, and its cooling effects will be dependent upon the situation encountered in the place: on the contrary side of a high area, usually hit by the wind — in maritime areas, it is the opposed side to the sea — there is descending current of air that is warmer (this wind is specifically called **Föhn**, similar to the known and characteristic phenomenon encountered in the Alps). It will thus be useful to select the cooler side of the mountain. Therefore, one should become acquainted with the wind in the area.

**Vegetation:** vegetation offers the most favorable biophysical and psychological conditions to increase the yield of work. Physical effort accomplished in natural surroundings — far from the gymnasiums and athletic tracks — is knowingly more fruitful, considering the training methods which exploit its benefits, such as «**Fartlek**» of **Costa Holmer**, or the «**Cross Promenade**» of **Mollet**. The Argentine **Tortorelli** outlines, in this respect, among various positive reasons, the absorption of the impurities of the air, the neutralization of noises and the tranquillizing and resting effects which are caused by the predominance of the green color. This reinforcing effect, encountered in the forest, becomes much more important in sports training in subtropical areas. By absorbing solar and atmospheric radiation, an area covered with trees offers always a lower temperature than an open area. A hill, covered with trees, offers this effect, added to that of altitude, and helps the environmental compensation to fatigue of effort that is being carried out.

The characteristic difference between the temperate forests and those of sub-tropical areas, in so far as physiological effects are concerned, seems to reside in the action of forestal aerosols, which are microscopic particles of resinous substances, in state of suspension. In accordance with **Tortorelli** (1966), in the first type, the forests are usually composed of a dominant type of tree (coniferous, mostly) which originate a specific

type of air, determined by the corresponding aerosols. These produce positive stimuli and negative ones (which are rarer) through an indirect influence over the nervous and cardiac systems (thence the reasons of the existence of the **Therapeutics Aerosol-Forestal**). Since in tropical forests, vegetation is marked by the larger number of species, it seems to be evident that there will always be a beneficial effect, since the positive particles represent the majority of the forestal aerosols.

The author of the present work had opportunity to gather subjective impressions from the training accomplished in a temperate forest, which is theoretically considered as being ideal for muscular activity (**Honefoss**, Norway, summer 1964) and one applied in a subtropical vegetal environment (**Sumaré**, Rio de Janeiro, autumn 1965 and 1966). As one may observe, the athletes considered this latter type to be less monotonous, both in view of the variety of the vegetation, as well as based on the aggressiveness of the scenery; the alternance of the closed spaces — upper part of trees, which touch themselves in certain areas, provide the impression of actual tunnels of vegetation — with open spaces, is the peculiar aspect of subtropical medium altitudes, which seem to have a more favorable aspect from the psychological point of view.

**City and Surroundings:** the variation of temperature produced by the location of populous centers may be relevant in certain cases for the programming of training. **Duckworth** and **Sandberg** verified that the temperature of a city is proportional to the constructed area and the populational density, conditioning the temperature of close - by areas. In a general way, the city is warmer in the evening than the suburbs, and the contrary occurs in the morning. Consequently, it will be good to program the periods of the training — both on tracks and mountains — quite early in the morning, in case the available locale is within a city, or at night, if it is in the suburbs.

(8) Like any other training method, **Altitude Training** is only a means and not an end purpose by itself. It is, therefore, important to stress that the yield will reside in the direct relation of the care of the factors that compose the so-called **Total Training** (**Mollet**, 1963), which in addition to the development of physical qualities, encompasses medical, social and psychological cares and accuracy of techniques — annual calendar, use of materiel, program of trips, acclimatization, place and discipline in the concentration, warming-up, competition, etc. Within this fundamental norm, the examination of the factors involved and to the functional programming are not envisaged by the present work and should be left at the free decision of the individual responsible for the training. In addition, with regard to the athlete himself, there is the basic and untouchable principle — so many times stressed in this work — of the «**individuality of training**», which will origi-

nate a large number of variations about the orientation presented herein and with regard to which, to establish a doctrine, we cite the interpretation of Mollet :

« Training is an individual art. There will never be a limit to progress in the training methods. Undoubtedly, the technique will be an exact science; this will never be the case, however, with its practical application, because each athlete always represents a new problem. »

## CONCLUSIONS

1. Man forms a system with the atmospheric environment by which he is surrounded and which is characterized by variations in temperature, humidity, pressure, wind, etc. This system has its internal and external parts separated by the skin, which acts as a neutral element.
2. The system, represented by the relationship between environment and man, is balanced when the internal temperature is approximately of 37° C and the external between 28° and 30° C. Outside of these figures, the mechanism of thermoregulation initiates to work.
3. The factor of temperature/humidity is the most important one to be taken into consideration in thermoregulation, inclusively by conditioning comfort and human activity. The values of the temperature and humidity, which define the zones of sensations and of production of effort, are a function of the gradient of the movement of air. In addition, the organism has specific reactions to the variations of pressure and to the atmospheric radiations.
4. The circulatory and respiratory systems are most active in the reaction to heat-humidity, and the cardiac frequency and body temperature are safe indexes for evaluating the effects of this factor.
5. Metabolism suffers influences from the temperature and its lower basal values are encountered in the zone of comfort, indicating that there is a minimum expenditure of energy in this specific situation. Nourishment also accompanies the variations in temperature and, in the case of hot surroundings, the deficit of calories is more important than that of the vitamins; in case it is inadequate, there will be deficiencies in thermoregulation.
6. The study of meteorotropical influences in physiological phenomena of physical effort is still in its initial stages. Some qualitative and quantitative measurements are already convergent in some points. It is known, for example, that heat-humidity restricts physical activity. Cardiac frequency, body temperature and perspiration are the normally used parameters for the study of its effects. These details are taken into consideration but on very few occasions, since they are not a priority problem in temperate countries, which are, as a coincidence, leaders of research of physical training.

7. Influence of the heat-humidity factor is only remarkable, in effort, after certain values of temperature and indexes of relative humidity. There is a certain range of these values, whose effects can only be perceived in accordance with the intensiveness of the exercise. Recovery, on the other hand, will be contingent directly upon these values and in environmental conditions, it can be observed through the cardiac frequency.

8. The effects of heat-humidity over resistance and strength still are not very clear. The same does not occur in relation to psychological reactions: one knows that the time of reaction is increased and that the power of concentration and the efficiency of work are reduced when certain values are surpassed.

9. Acclimatization is a phenomenon, the mechanism of which is little known: it involves interposed and simultaneous functions, which make research difficult. Biometeorology studies its gradual effects in relation to the time, including the generation of the descendants of individuals removed from their original environments. The more used parameters by research are sweat, cardiac frequency, internal temperature and circulatory and endocrinous systems. The « time » factor is the functional element envisaged by the experiments. The examination of this factor evidences that physical activity speeds up acclimatization. By presupposing that he acclimatized individual to heat-humidity has a better yield in this work than non-acclimatized individuals, in a tropical climate, it is necessary to dislocate the values of the zones of comfort and of efficiency in the sense of the higher temperatures and relative humidity. Furthermore, it is demonstrated, in this respect, that this change is not substantial since the limits for the practice of sports can be more easily reached in tropical areas. The fatal cases are rare, either as a result of the defense of the organism which reduces the intensity of the effort, or by the nature of the type practiced which permits, in certain cases, the alternance of efforts with pauses for recovery. The explanation for the decline in athletic yield in tropical areas would reside in this fact.

10. Individually of meteorotropical reactions is an important parameter in the evaluation of biometeorological phenomena. Being a characteristic element of genetics itself, a concept is formed that reactions are always different, but similar. Reduction of a statistical error is obtained through the establishment of group homogeneity, maintaining the diversity of types. Therefore, one considers the following factors: age, sex, race, color of skin, morphological type, health and habit to adverse conditions.

11. The formula of general terms which will serve as a guide for the research of meteorotropical reactions in effort made in tropical environments, according to a proposition of the author, is the following: **meteorotropical reaction = intensity and duration of effort ± degree of acclimatization ± degree of adaptation to effort in hot-humid environments ± biological individuality.**



12. Field experiments were accomplished, within the earlier premises, with the objective of observing **Resistance** and **Endurance** under the light of the accomplished effort in tropical environments. It was concluded that :

- a) Tropical climate limits the capacity of raising the level of possibilities with regard to **Resistance** and **Endurance** for the sportive activities which demand efforts at long range.
- b) The decline in the yield may be evaluated at approximately 15 % of the potential of the athlete which is defined by the amplitude of the range of fluctuations of his results, obtained during the period of time considered. This decline in performance is relative to marks obtained, respectively, at 20 and 30° C of average temperatures in the shadow and under an index of relative humidity around 80 %. In case the athlete increases the intensity of the performance, the production will decline quickly and in accordance to a parabolic curve.
- c) Training is thus limited by the external conditions, which, by not enabling to attain the maximum capability of the individual, does not permit that there be a corresponding development.

13. Observation of the facts reinforces these statements and conduct to us to the supposition that the ideal climate for sportive activities is the dry climate, without extremes of cold and heat. On the other hand, tropical climate would offer exceptional advantages, with regard to water sports.

In any way, the increase in the level of possibilities for the tropical ground athlete can only be obtained through the exploitation of permanent and temperate micro-climates. This type of environment can be located through a geosportive survey and offers the easiness of being able to work during the whole year, providing flexibility for the annual calendar, which would not be based on the seasons of the year.

This easiness would only be encountered in tropical and subtropical areas, counterbalancing the negative factors and would also provide a considerable advantage over the athletes of the temperate regions.

14. The author made a survey of this type and used a mountain of 1 000 meters altitude, where he applied a mixed method of training. It was found in the experimental group that only the dislocation of part of the training to a more indicated environment rose the level of possibilities by 10 % within the short period of 12 weeks, with regard to the results that were obtained earlier through different processes with the same group of athletes who showed stagnation, with some elements in decadence.

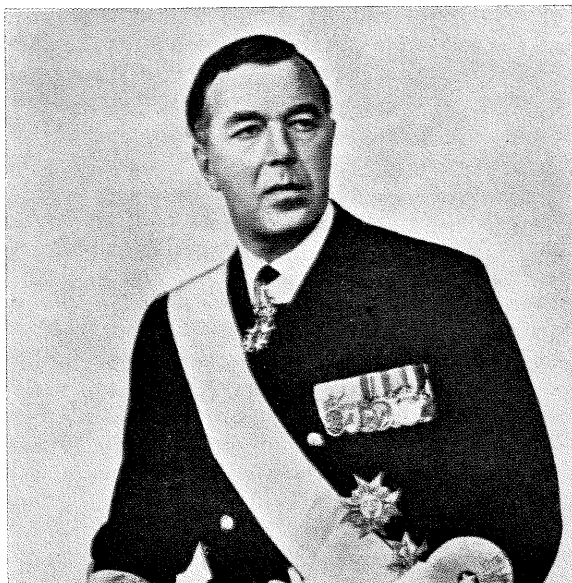
In view of the hypothesis of altitude influence, new research was developed at the end of which it was established, in experimental character, that the concept and method of **Altitude Training** would be a method of priority feasibility for tropical and subtropical climates.

15. Basically, **Altitude Training** envisages to exploit altitude as a form of physical preparation and does not restrict itself to training in altitudes, but to pass from one level to another, so as to encounter a progressive decline in the partial oxygen pressure. The altitude in this process acts as a « load » of a given exercise, and then specific functional adaptations will arise in relation to the resistances offered by altitude and by the difficulty of making progress in inclined ground, and not the modifications of physiological order that are normally observed in the phenomenon of acclimatization.

16. Essentially, to train in high places originates performances of improved nature in lower levels, but in transitory conditions, because the advantage disappears at the end of a few days, whilst through **Altitude Training**, one attempts the permanent establishment of the benefits of altitude.



# The XIXth Military Pentathlon



*To our pleasure and pride, Sweden has been selected to organise CISM's XIXth Championship of Military Pentathlon.*

*We are going to do our very best to give this competition of the world's hardest sport a sportsmanlike environment and to make the stay in our country interesting and pleasant for our guests.*

*All the best military pentathlonists in the world will be present for the competition which will assure us of a thrilling fight between good sportsmen.*

*I welcome the competitors and the leaders to Sweden and to the CISM's 1967 Championship of Military Pentathlon.*

A handwritten signature in dark ink, appearing to be 'J. J. J. J.' or similar, written in a cursive style.



*I welcome you — representatives from the participating CISM countries to Sweden. Every military man knows the importance of good competence in the events that the Military Pentathlon includes. As the foremost military representatives of this sport are now going to meet in CISM's XIXth Championship of Military Pentathlon, we can expect hard and thrilling competitions.*

*The Royal Signal regiment of Uppland has been entrusted with the organisation of the competitions. It is my sincere hope that the competitions will be successful and that the participants will profit by their stay in our country on the ranges as well as outside.*

A handwritten signature in dark ink, appearing to be 'P. R. R. R.' or similar, written in a cursive style.





Uppsala's Cathedral

# Well done Sweden!

For the CISM leaders, Military Pentathlon is not just one of the numerous annual CISM events. It is the most important championship of its calendar. For several reasons.

Since the French Colonel H. Debrus, our founder President, created Military Pentathlon at Antibes 19 years ago, progress has been continuous, as well in the field of organization as for the high standing of the performances.

Watching young officers and NCOs, shooting world marks at 200 m, negotiating the gruelling obstacle course, acrobatically swimming the 50 m, course crammed with logs, platforms and rafts to overcome, throwing a grenade and running 8 km the last day in the « solitude of the distance runner » is indeed a wonderful sight.

On another hand, for the « insider », the sum of hard work and technical training necessary to reach such summits is certainly appalling.

It proves that the military pentathlon has been adopted with ever increasing success by the Armed Forces of the participating nations.

After its modest start in 1950 when three nations only entered the competition the Military Pentathlon has met each year with growing success. The competitions are extremely keen, although held in a spirit of friendship and fair play.

Important also is the fact that this military event is practised on a large scale in the Armed Forces of many countries, within the Framework of national championship.

In Upsalla, Sweden was at its best. The organization under the smiling leadership of Colonel Syberg was perfect. The hospitality was generous, the friendship was at its peak.

Just as the Swedish team...

Well done Sweden!

## Team :

- 1 SWEDEN
- 2 FRANCE
- 3 NORWAY

## Individual :

- 1 CHRISTENSSON  
(Sweden)
- 2 BJÖRKLUND  
(Sweden)
- 3 PEDERSEN  
(Norway)



## KUNGLIG UPPLANDS SIGNALREGEMENTE

The royal Signal Regiment of Uppland (S 1) is a modern representative of a long military history. Military units have been drilled here for centuries and at least since 1680 at the regiment's present location, Polacksbacken.

In 1957 the Royal Regiment of Uppland (I 8) was abolished and the Signal Regiment moved here from Stockholm and took over the premises and the traditions. The regiment now bears both its own standard and that of the discontinued infantry regiment for which Varberg, 1565, was the first of a long series of victories, which ends with Svensksund, 1790.

The Signal Regiment's own history does not of course date back so far. It begins with a field signal company in the Royal Engineers in 1871.



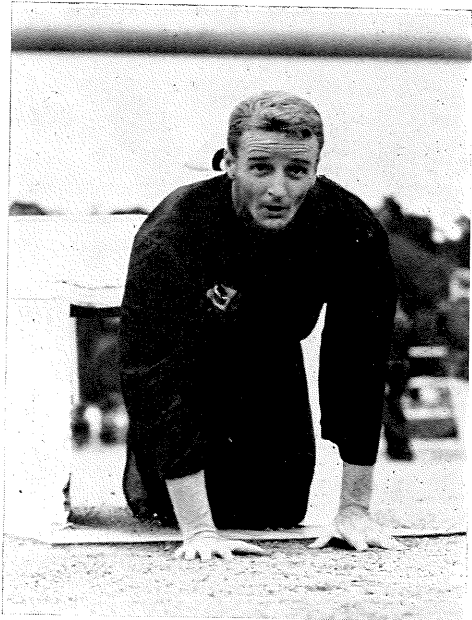
The Chiefs of delegation paid a visit to the grave of former United Nations Secretary General Dag Hammarhöld.



A new CISM record !  
 This smiling Marksman Björklund (Sweden), scored 97 points for precision shooting at 200 m and 98 points for rapid firing (10 shots in one minute at 200 m !)  
 For a grand total of 195 points  
 Congratulations !



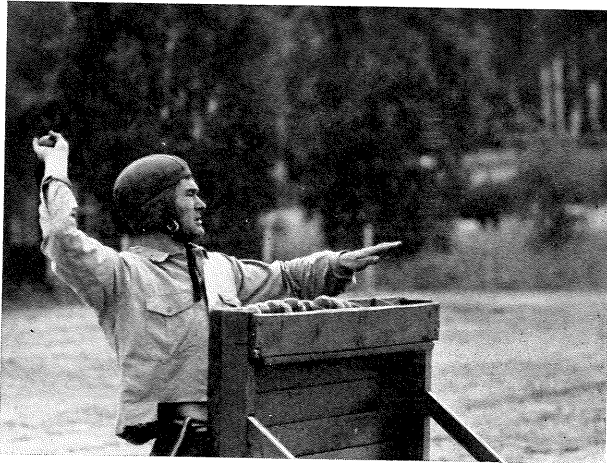
The impressive obstacle Nr 1  
 Two competitors have already recovered from a 5 meters jump.



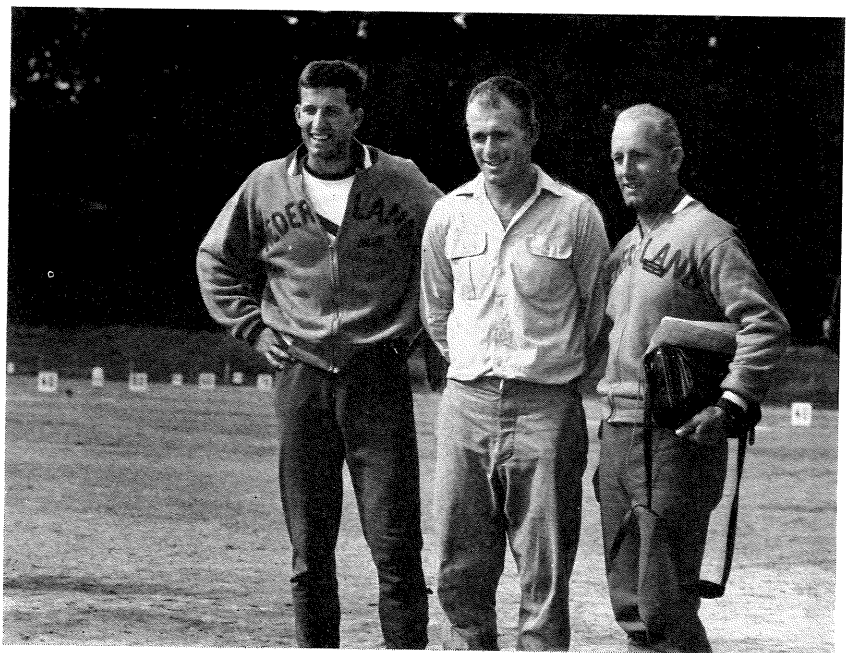
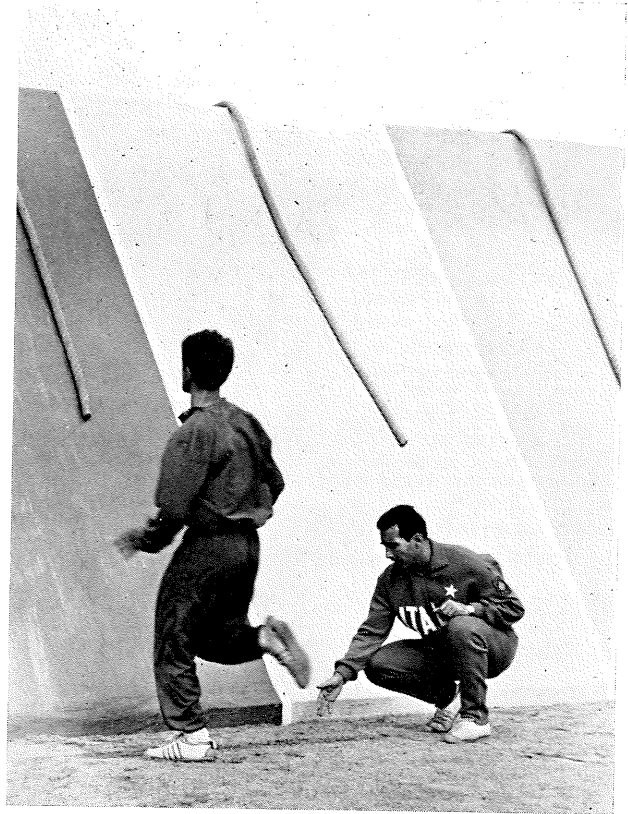
Cantarelli, Brazil, was brilliant and held the leadership till the very last event.

A first class obstacle course allowing three competitors to run simultaneously had been built. 2 000 spectators saw a great victory of Björklund, Sweden. (Yes, him again in 2'.)

An Italian competitor during a training session. « To climb over the wall, you start from here », says his coach



Grenade Throwing. Concentration, accuracy and power.

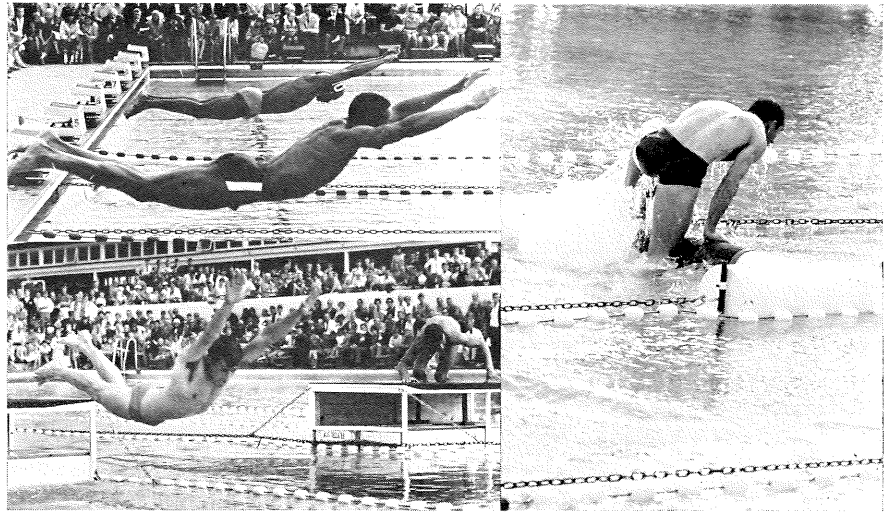


Hop, Hop, Holland ! The best throwers were from « Nederland » This team displayed nice overall progresses.

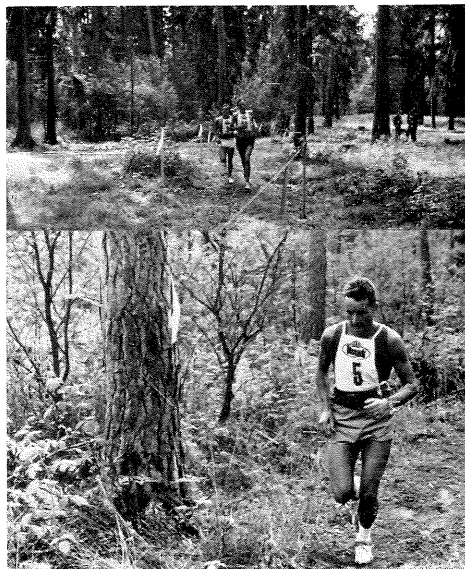


RESULTS

- 1 SWEDEN :  
Christensson, Friberg,  
Björklund, Nilsson  
20.479,18
- 2 FRANCE :  
Julien, Rauner,  
Mouriesse, Muller  
20.049,18
- 3 NORWAY :  
Pedersen, Högseth,  
Lund, Tessem  
19.932,86
- 4 BRAZIL :  
Cantarelli, Ulisses,  
Barnabé, Sobrinho  
19.654,84
- 5 AUSTRIA :  
Schackl, Winkler,  
Friesl, Schaffer  
19.515,86
- 6 DENMARK :  
Fallesen, Funch,  
Andersen, Nielsen  
18.997,92
- 7 NETHERLANDS :  
Keunen, van Knijff,  
Lucas, Gaasbeek  
18.898,38
- 8 BELGIUM :  
Ooms, De Locht,  
van Mol, Verdin  
18.533,90
- 9 SWITZERLAND :  
Dubi, von Niederhäusern,  
Zürny, Kühnis  
18.069,16
- 10 GERMANY :  
Huf, Lulies,  
Mohr, Priebe  
17.850,62
- 11 ITALY :  
Monterubbiano, Gregu,  
Simeoni, Atzei  
17.640,54



Swimming : Start and obstacles 1 and 4



All alone, in the beautiful woods, for 8 km.

Swimming :  
The winner Tandl.

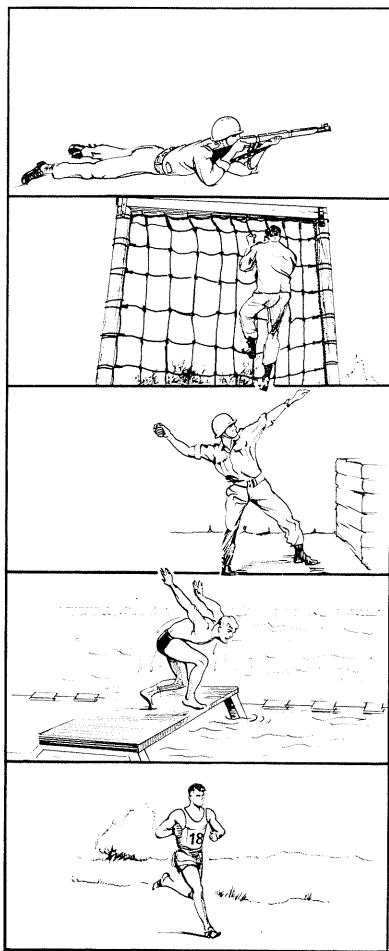


« Mål » in Swedish means « Finish ». It was a welcome sight for Lt. Christensson who, thanks to a 3rd place in the cross-country race, won the general classification and the CISM title for the fourth time.

A Proud trio. — Three outstanding athletes :  
Nilsson, Chistensson, Björklund.



# RESULTS OF THE XIXth MILITARY PENTATHLON CHAMPIONSHIPS



Shooting	1) BJÖRKLUND (Sweden) 195 2) LUND (Norway) 192 3) FRIBERG (Sweden) 191
Obstacle course	1) BJÖRKLUND (Sweden) 2'26'' 2) FRIBERG (Sweden) 2'27'' 3) HÖGSETH (Norway) 2'30''
Grenade throwing	1) KEUNEN (Netherlands) 196,92 2) CANTARELLI (Brazil) 194,61 3) VAN KNIJFF (Netherlands) 192,62
Swimming	1) TANDL (Austria) 27''8 2) BARNABE (Brazil) 28''2 3) SOBRINHO (Brazil) 28''4
Cross-country	1) PEDERSEN (Norway) 25'30''9 2) FALLESEN (Denmark) 26'09''0 3) CHRISTENSSON (Sweden) 26'34''0

Place, Name and Nation	Total	Shooting		Obstacle run		Grenade throwing		Swimming		Cross-country	
		score	points	time	points	score	points	time	points	time	points
1 CHRISTENSSON (Sweden)	5.180,24	181	1.007	2.31,9	1.056,7	175,49	972,94	29,1	1.057,6	26.34,0	1.086,0
2 BJÖRKLUND (Sweden)	5.159,72	195	1.105	2.26,0	1.098,0	168,72	932,92	29,5	1.048,0	28.24,2	975,8
3 PEDERSEN (Norway)	5.116,10	183	1.021	2.33,1	1.048,3	177,35	984,10	35,1	913,6	25.30,9	1.149,1
4 CANTARELLI (Brazil)	5.107,96	184	1.028	2.31,9	1.056,7	194,61	1.087,66	30,2	1.031,2	29.35,6	904,4
5 FRIBERG (SWEDEN)	5.078,26	191	1.077	2.27,0	1.091,0	152,51	835,06	29,7	1.043,2	27.28,0	1.032,0
6 NILSSON (Sweden)	5.060,96	183	1.021	2.35,7	1.030,1	185,61	1.033,66	32,2	983,2	28.07,0	993,0
7 RAUNER (France)	5.045,14	185	1.035	2.35,0	1.035,0	168,94	933,64	30,0	1.036,0	27.54,5	1.005,5
8 KARLSSON (Sweden)	5.043,72	183	1.021	2.30,8	1.064,4	164,72	908,32	30,7	1.019,2	27.29,8	1.030,8
9 WINKLER (Austria)	5.029,34	183	1.021	2.32,7	1.051,1	176,84	981,04	33,5	952,0	27.35,8	1.024,2
10 JULIEN (France)	5.022,92	181	1.007	2.33,6	1.044,8	163,42	900,52	31,6	997,6	26.47,0	1.073,0



The Swedish team tosses in the air the glorious winner.



The Closing Ceremony took place in the Historic Castle of Uppsala. The prizes were presented by Lt General Akerman, Chairman of the Swedish Military Sports Association (S. M. I.). From right to left : the Winner, Christensson (Sweden), the Runner-Up : Björklund (Sweden), the Third, Pedersen (Norway).



# LIFE AT CISM



Recently Marechal Castello Branco, former President of Brazil, died in a aircraft accident.

President Castello Branco was CISM Member of Honor since 1966. Last year during an official ceremony, at Brazilia, he kindly accepted the CISM Medal of Honour presented to him by President Hatch. At this occasion he showed the greatest interest for our activities and program.

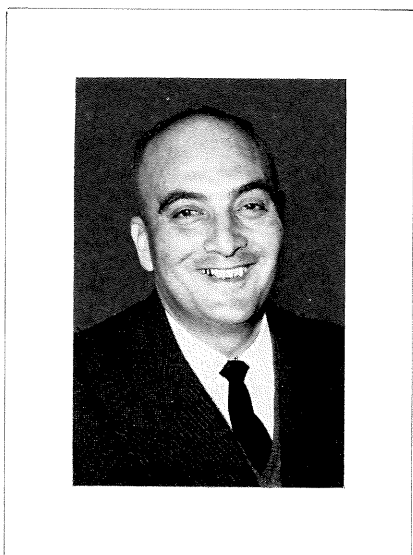
CISM presents to the Brazilian Delegation his most sincere condolences

## Bill McNamara received an award



*Bill McNamara our talented and smiling chief of information was given a special award by the United States Junior Chamber of Commerce for his contributions to improving the physical fitness of the American youth. This was the first special award presented by that 150,000 members organization.*

## « Au revoir » Mister Hamouda



*The Tunisian delegation has announced that Lt Colonel H. Hamouda has retired from active duty.*

*This departure from the CISM and the Academy will be sincerely regretted.*

*The « team » Ben Ammar, Baly, Hamouda is famous in our organization. CISM is indebted to them for several championships, Academy and Executive Committee meetings, as well as for the running of the Liaison Office for Africa.*

*Colonel Hamouda was the « sports father » of Gammoudi, Kamassi, Ayachi, M'Heddeb, the well known group of athletes who, so many times, were successful in Cross-country and Track and Field.*

*Colonel Hamouda was the proud builder of the magnificent military sports center Le Bardo where CISM was always welcome.*

*Several CISM clinics were sponsored there. Last but not least we are also indebted to Colonel Hamouda for the splendid CISM Anthem.*

*CISM says « au revoir » and good luck in his new career, to one of its best delegate who did so much for CISM and his Academy.*